Nokia Customer Care

Service Manual

RM-217; RM-222 (Nokia 6300; Nokia 6300b)
Mobile Terminal

Part No: 9255319 (Issue 1)

COMPANY CONFIDENTIAL

Amendment Record Sheet

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IMPORTANT

This document is intended for use by qualified service personnel only.

Warnings and cautions

Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/ MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- During testing never activate the GSM transmitter without a proper antenna load, otherwise the GSM PA may be damaged.

For your safety

QUALIFIED SERVICE

Only qualified personnel may install or repair phone equipment.

ACCESSORIES AND BATTERIES

Use only approved accessories and batteries. Do not connect incompatible products.

CONNECTING TO OTHER DEVICES

When connecting to any other device, read its user’s guide for detailed safety instructions. Do not connect incompatible products.

Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages MUST NOT be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

Battery information

Note: A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMh batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77°F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

Company Policy

Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA MOBILE PHONES Business Group should be notified in writing/e-mail.

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- Latest Amendment Number (if applicable)
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Nokia 6300; Nokia 6300b Service Manual Structure

1 General information
2 Parts and layouts
3 Service Software Instructions
4 Service Tools and Service Concepts
5 Disassembly and reassembly instructions
6 BB Troubleshooting and Manual Tuning Guide
7 RF Troubleshooting and Manual Tuning Guide
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1 — General information

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Product selection

The RM-217 and RM-222 are class 4 (max 2W) GSM triband hand portable phones, supporting GSM 850/1800/1900 (RM-222) and 900/1800/1900 (RM-217) bands, respectively. The RM-217/222 also supports EGPRS and GPRS (Packed data). It is a class B&C terminal, supporting EGPRS multislot class 10 (4Rx + 1Tx and 3Rx + 2Tx) and GPRS multislot class 10 (4+1, 3+2).

The RM-217/222 is MMS (Multimedia Messaging Services) version 1.2 enabled phone with a QVGA 240x320 pixel, active TFT 16.7 million colour display. It also has an integrated 2 Mpix digital camera with a 8 x digtal zoom.

The RM-217/222 has a 3GPP video player/recorder, FM stereo radio and a music player, and it supports Bluetooth 2.0 + EDR standard as well as microSD card with hotswap possibility.

The XHTML/WAP browser in RM-217/222 is compatible with the version 2.0 specifications and it supports HTTP/TCP/IP stack.

In addition the RM-217/222 is a Java-enabled phone (Java^{TM} 2 Platform, Micro Edition, for embedded devices). It supports MIDP Java 2.0 with additionally APIs.

The supported user interface is S40, that is, RM-217/222 software is based on the ISA platform.

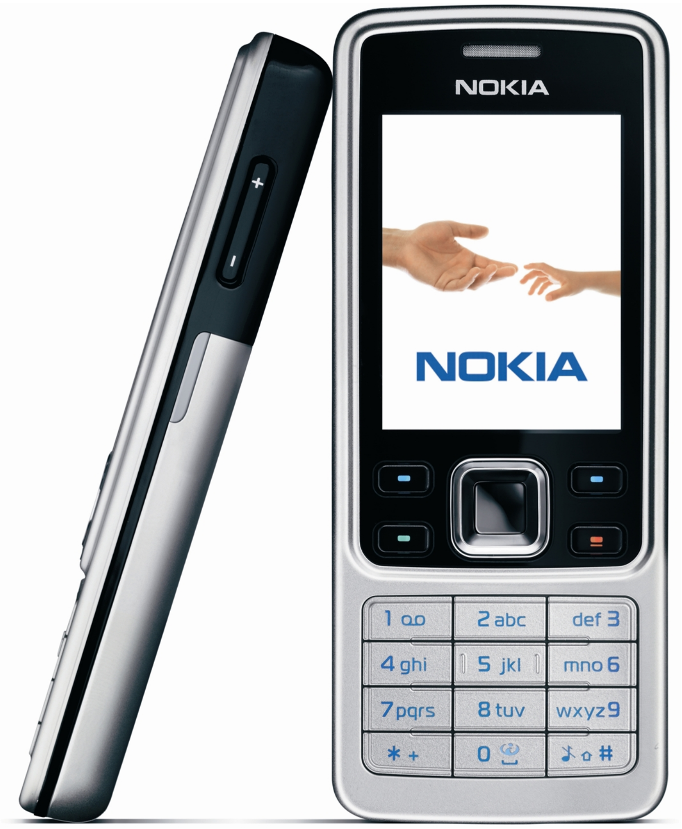

Figure 1 View of RM-217/222

Features

Phone features

General features

- Demo mode (phone demo without SIM card)

Hardware features

Display and keypad features

- Main display: Active TFT QVGA display supporting up to 16,7 million colors (320 x 240 pixels, 2 inches active area)
- Power switch
- Side volume keys

Hardware characteristics

- Monoblock phone
- 2-Mpix camera with 8 x digital zoom
- Hotswap µSD memory card slot (under the battery cover)
- Stereo FM radio and music player
- Integrated handsfree speaker
- Internal vibra
- Bluetooth
- 2.0 mm DC charger plug interface
- Mini-USB connector
- 2.5mm Nokia AV connector

Software and User interface features

Software features

- ISA OS 8.0s Platform
- Nokia Series 40 User interface (UI): Java^{TM} MIDP 2.0

UI features

Imaging	• 2.0-megapixel camera with 8x digital zoom (1600 x 1200 pixel resolution) • Full-screen viewfinder • PictBridge printing via USB cable
Multimedia	• MP3 player supporting formats including MP3, Midi, AAC, AAC+, enhanced AAC+, WMA • FM stereo radio, Visual Radio and music player • 3GPP video player/recorder • MP3 ringing tones, True tones and MIDI tones, with support of 64 polyphony
Memory functions	• Combo memory with 32 MB flash and 16 MB RAM – about 7 MB user memory (for gallery and applications, contacts, notes, calendar entries) • Hotswap microSD memory card slot supporting up to 2GB microSD memory cards (available as enhancements)

Messaging	• Simplified messaging with recently used contacts log and groups • Email: Access your work and private email accounts; supports SMTP, POP3, and IMAP4 protocols. Support for attachments (Java version) • Audio messaging service (AMS): Record your own voice message and send to compatible devices • MMS OMA 1.2: Combine image, video, text, and voice clips and send as an MMS to a compatible phone or PC; use MMS to tell your story with a multi-slide presentation. The MMS OMA 1.2 specification allows you to send/receive messages up to 300 kB in size. • Text messaging: Supports concatenated SMS, picture messaging, SMS distribution list • Predictive text input: Support for all major languages in Europe and Asia-Pacific • Instant Messaging (IM)
Applications	• Java™ MIDP 2.0 with over-the-air download • Pre-installed Java™-based applications and games • SIM Application Toolkit • Wireless Presenter
Connectivity	• Nokia PC Suite with USB and Bluetooth connectivity • Bluetooth wireless connectivity (SIM access, headset, and handsfree profiles) incl. stereo support for headsets • Nokia AV connector interface with USB • FOTA (Flashing over-the-air) • Local/remote SyncML data synchronization
Browsing	• Integrated XHTML browser • Smart content download - OMA DRM 2.0
Data transfer	• EDGE (EGPRS): Class 10, download up to 236.8 kbps • GPRS: Class 10, download up to 53.6 kbps **Note:** Actual achieved speeds may vary depending on network support • GPRS/EDGE/HSCSD/CSD for browsing and as data modem • Downlink Advanced Receiver Performance (DARP)
Voice features	• Push To Talk: Select the person or group you want to talk to and press the Push To Talk key to communicate • Enhanced voice dialling with SIND: Speaker-independent name dialling for easy call handling • Integrated handsfree speaker with a new high quality speaker for better audio experience (stereo widening effects when attaching the headset) • Voice commands • Voice recorder

Digital services	• User Interface (UI) themes including e.g. animated wallpapers, screensavers, color schemes, ringing tones • Ringing tones: Video, MP3 ringing tones, True Tones and MIDI ringing, alert, and gaming tones with support of 64 polyphony • OTA download possibility for: Themes, True Tones, MP3 ringing tones, MIDI ringing tones, screensavers, wallpapers, 3GPP streaming, images and videos, Series 40 Java games and applications
Personal information management (PIM)	• Organizer with alarm clock, calendar, to-do list, notes, calculator, countdown timer, and stopwatch • Manage your time and information with the enhanced calendar that can be synchronized, for example, with Microsoft and Lotus PIM application calendars by using the Nokia PC Suite
Call management	• Speed dialling • Logs: Keeps lists of your dialled, received, and missed calls • Automatic answer (works with headset or car kit only) • Call waiting, call hold, call divert, call timer

Accessories

Table 1 Audio

Type	Name
AD-42W	Wireless audio gateway
HS-40	Mono headset
HS-16, HS-42, HS-47	Stereo headsets
BH-300, BH-601, BH-700, BH-800, BH-900, HS-4W, HS-50W	Wireless mono headsets
HS-21W, HS-24W, HS-25W, HS-26W, HS-34W, HS-36W, HS-37W, HS-57W, HS-58W	Wireless stereo headsets

Table 2 Battery and chargers

Type	Name
Note: This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The 3.5 mm standard charger can be used together with the CA-44 charger adapter.	
AC-3/AC-5	Compact charger
AC-4	Travel charger
BL-4C	Battery 860 mAh Li-Ion
CA-44	Charger adapter (from 3.5 mm -> 2 mm)

Table 3 Car accessories

Type	Name
CK-1W	Wireless car kit
CK-7W	Basic universal car kit
CK-20W	Car Installation Kit
CR-39	Universal holder
DC-4	Mobile charger
HF-35W	Wireless Car Handsfree
N616	Car phone

Table 4 Data

Type	Name
DKE-2	Mini USB connectivity cable
MU-22	1 GB µSD card
MU-26	128 MB µSD card
MU-27	256 MB µSD card
MU-28	512 MB µSD card
MU-37	2 GB µSD card

Table 5 Imaging

Type	Name
PT-6	Remote camera

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2 — Parts and layouts

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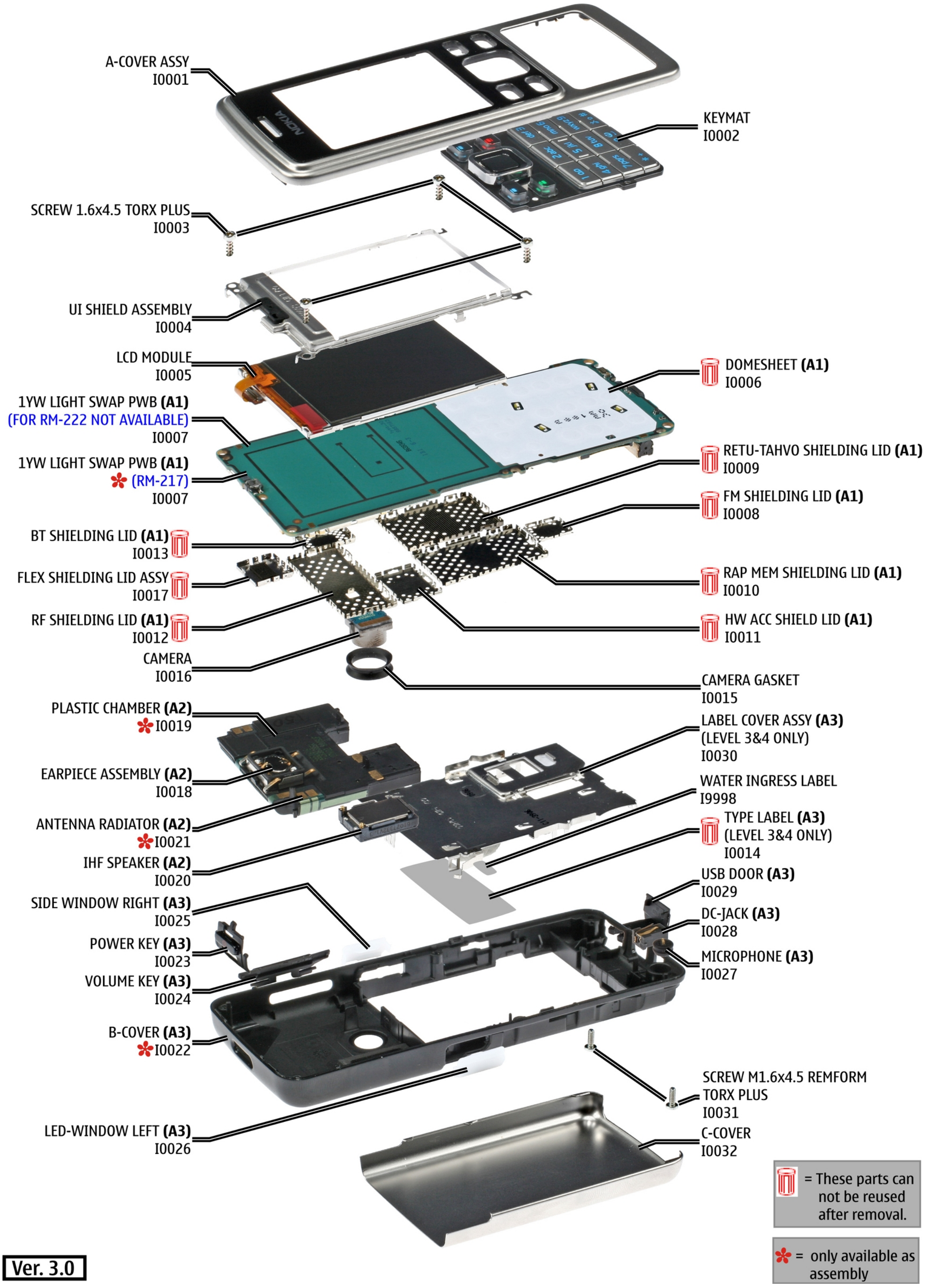
Exploded view

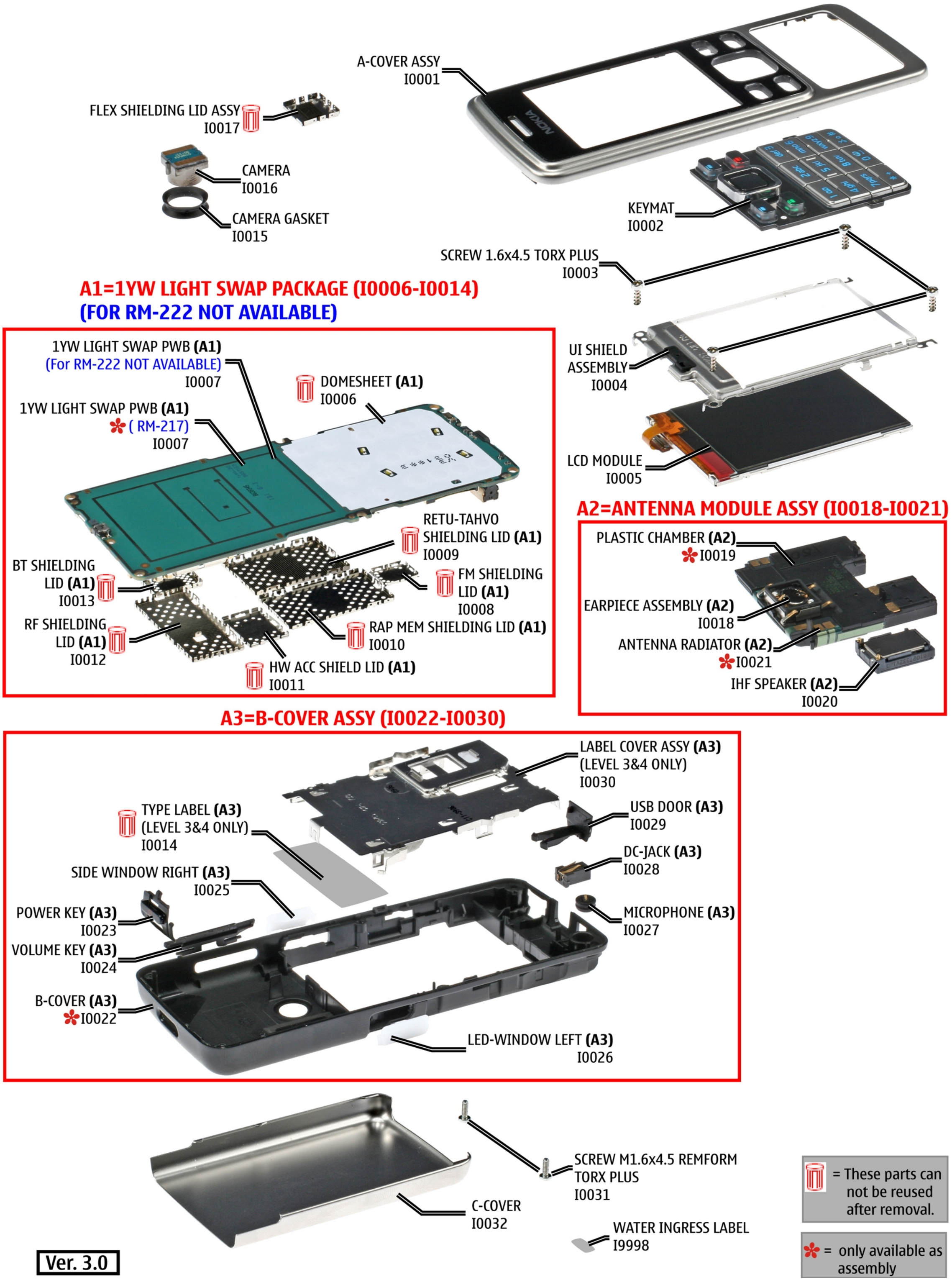
Exploded view

6300 RM-217 / 6300b RM-222 EXPLODED VIEW


A-COVER ASSY
I0001
KEYMAT
I0002
SCREW 1.6x4.5 TORX PLUS
I0003
UI SHIELD ASSEMBLY
I0004
LCD MODULE
I0005
DOMESHEET (A1)
I0006
1YW LIGHT SWAP PWB (A1)
(FOR RM-222 NOT AVAILABLE)
I0007
1YW LIGHT SWAP PWB (A1)
* (RM-217)
I0007
RETU-TAHVO SHIELDING LID (A1)
I0009
FM SHIELDING LID (A1)
I0008
BT SHIELDING LID (A1)
I0013
FLEX SHIELDING LID ASSY
I0017
RAP MEM SHIELDING LID (A1)
I0010
RF SHIELDING LID (A1)
I0012
HW ACC SHIELD LID (A1)
I0011
CAMERA
I0016
CAMERA GASKET
I0015
PLASTIC CHAMBER (A2)
* I0019
LABEL COVER ASSY (A3)
(LEVEL 3&4 ONLY)
I0030
EARPIECE ASSEMBLY (A2)
I0018
WATER INGRESS LABEL
I9998
ANTENNA RADIATOR (A2)
* I0021
TYPE LABEL (A3)
(LEVEL 3&4 ONLY)
I0014
IHF SPEAKER (A2)
I0020
USB DOOR (A3)
I0029
SIDE WINDOW RIGHT (A3)
I0025
DC-JACK (A3)
I0028
POWER KEY (A3)
I0023
MICROPHONE (A3)
I0027
VOLUME KEY (A3)
I0024
B-COVER (A3)
* I0022
SCREW M1.6x4.5 REMFORM
TORX PLUS
I0031
LED-WINDOW LEFT (A3)
I0026
C-COVER
I0032
🗑 = These parts can not be reused after removal.
* = only available as assembly
Ver. 3.0

Mechanical spare parts overview

6300 RM-217 / 6300b RM-222 SPARE PARTS OVERVIEW


A-COVER ASSY
I0001
FLEX SHIELDING LID ASSY
I0017
CAMERA
I0016
CAMERA GASKET
I0015
KEYMAT
I0002
SCREW 1.6x4.5 TORX PLUS
I0003
A1=1YW LIGHT SWAP PACKAGE (I0006-I0014)
(FOR RM-222 NOT AVAILABLE)
1YW LIGHT SWAP PWB (A1)
(For RM-222 NOT AVAILABLE)
I0007
DOMESHEET (A1)
I0006
1YW LIGHT SWAP PWB (A1)
(RM-217)
I0007
RETU-TAHVO SHIELDING LID (A1)
I0009
BT SHIELDING LID (A1)
I0013
FM SHIELDING LID (A1)
I0008
RF SHIELDING LID (A1)
I0012
RAP MEM SHIELDING LID (A1)
I0010
HW ACC SHIELD LID (A1)
I0011
UI SHIELD ASSEMBLY
I0004
LCD MODULE
I0005
A2=ANTENNA MODULE ASSY (I0018-I0021)
PLASTIC CHAMBER (A2)
I0019
EARPIECE ASSEMBLY (A2)
I0018
ANTENNA RADIATOR (A2)
I0021
IHF SPEAKER (A2)
I0020
A3=B-COVER ASSY (I0022-I0030)
LABEL COVER ASSY (A3)
(LEVEL 3&4 ONLY)
I0030
TYPE LABEL (A3)
(LEVEL 3&4 ONLY)
I0014
USB DOOR (A3)
I0029
DC-JACK (A3)
I0028
SIDE WINDOW RIGHT (A3)
I0025
MICROPHONE (A3)
I0027
POWER KEY (A3)
I0023
VOLUME KEY (A3)
I0024
B-COVER (A3)
I0022
LED-WINDOW LEFT (A3)
I0026
SCREW M1.6x4.5 REMFORM TORX PLUS
I0031
C-COVER
I0032
WATER INGRESS LABEL
I9998
= These parts can not be reused after removal.
= only available as assembly
Ver. 3.0

Parts list

Mechanical spare parts list

Note: For Nokia product codes, please refer to the latest Service Bulletins on the Partner Website (PWS).

To ensure you are always using the latest codes, please check the PWS on a daily basis.

Ax and in bold = ASSY

"-" = NOT AVAILABLE

"XXXXXXX" = VARIANTS

"???????" = Code available in Bulletin

I0xx = ITEM codes for upper or mono block

I1xx = ITEM codes for hinge block

I2xx = ITEM codes for lower block

I3xx = ITEM codes for soldered spare parts on the upper, hinge or lower block and not exchangeable

ITEM/ CIRCUIT REF.	QTY	PART NAME	Note
I0001	1	A-COVER ASSY	
I0002	1	KEYMAT	
I0003	4	SCREW 1.6X4.5 TORX PLUS	
I0004	1	UI SHIELD ASSEMBLY	
I0005	1	LCD MODULE	
A1	**1**	**1YW LIGHT SWAP PACKAGE (I0006 - I0014)**	
I0006	1	DOMESHEET	Cannot be reused when removed.
I0007	1	1YW LIGHT SWAP PWB	
I0008	1	FM SHIELDING LID	Cannot be reused when removed.
I0009	1	RETU-TAHVO SHIELDING LID	Cannot be reused when removed.
I0010	1	RAP MEM SHIELDING LID	Cannot be reused when removed.
I0011	1	HWA SHIELDING LID	Cannot be reused when removed.
I0012	1	RF SHIELDING LID	Cannot be reused when removed.
I0013	1	BT SHIELDING LID	Cannot be reused when removed.
I0014	1	TYPE LABEL	Cannot be reused when removed.
I0015	1	CAMERA GASKET	
I0016	1	CAMERA	
I0017	1	FLEX SHIELDING LID ASSY	Cannot be reused when removed.
A2	**1**	**ANTENNA MODULE ASSY (I0018 - I0021)**	
I0018	1	EARPIECE ASSEMBLY	

ITEM/ CIRCUIT REF.	QTY	PART NAME	Note
I0019	1	PLASTIC CHAMBER	
I0020	1	IHF SPEAKER	
I0021	1	ANTENNA RADIATOR	
A3	**1**	**B-COVER ASSY (I0022 - I0030)**	
I0022	1	B-COVER	
I0023	1	POWER KEY	
I0024	1	VOLUME KEY	
I0025	1	SIDE WINDOW RIGHT	
I0026	1	LED WINDOW LEFT	
I0027	1	MICROPHONE	
I0028	1	DC JACK	
I0029	1	USB DOOR	
I0030	1	LABEL COVER ASSY	
I0031	2	SCREW 1.6 x 4.5 REMFORM TORX PLUS	
I0032	1	C-COVER	
I9998	1	WATER INGRESS LABEL	

Note
Antenna Module is marked 850 or 900 to enable identification of different versions by regions.

Component parts list (1ywa_32a)

Item	Side	Grid		Description and value	
A2200	Bottom	K	3	SHIELD_040_025976	RETU TAHVO SHIELD ASSY 040-025976 P2912
A2400	Bottom	T	3	SHIELD_0264510	FLEX SHIELD FRAME 031886 P2908
A2800	Bottom	K	7	SHIELD_040_025979	RAP_MEM SHIELD ASSY 040-025979 P2912
A3300	Bottom	O	8	SHIELD_040_025020	HW_ACC ASSEMBLY 040-025020 P2912
A6000	Bottom	Q	2	SHIELD_040_031454	BT SHIELD ASSY 031454 P2908
A6100	Bottom	G	6	SHIELD_040_031457	FM SHIELD ASSY 031457 P2908
A7000	Bottom	R	6	SHIELD_040_009342	RF ASSEMBLY 040-009342 P2465

Item	Side	Grid		Description and value	
B2100	Bottom	B	8	MIC_OBE_415S42_RC3310CL_CARBON	CLAPTON EMC MICROPHONE MOD -42DB
B2101	Bottom	T	6	SPEAKER_LTR_RDF_COMB	EARP RDF-07A 32OHM 10.86x7.40.2.25
B2200	Bottom	M	3	CRYSTAL_3.3X1.6_H0.9	CRYSTAL 32.768KHZ +/-30PPM 12.5PF
C2000	Top	A	4	0402C	CHIPCAP NP0 27P J 50V 0402
C2001	Top	A	3	0603C_H0.95	CHIPCAP X5R 470N K 25V 0603
C2002	Top	A	5	0603C	CHIPCAP X7R 10N K 50V 0603
C2008	Bottom	C	2	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2030	Bottom	E	5	0402C	CHIPCAP NP0 270P J 50V 0402
C2031	Bottom	E	5	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2032	Bottom	D	5	0402C	CHIPCAP X7R 10N K 16V 0402
C2033	Bottom	E	4	0402C	CHIPCAP X7R 33N K 10V 0402
C2034	Bottom	E	4	0402C	CHIPCAP X7R 33N K 10V 0402
C2035	Bottom	C	5	0402C	CHIPCAP NP0 27P J 50V 0402
C2040	Bottom	H	5	0603C	CHIPCAP X5R 2U2 K 6V3 0603
C2041	Bottom	C	3	0603C	CHIPCAP X5R 2U2 K 6V3 0603
C2042	Bottom	D	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2043	Bottom	C	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2044	Bottom	C	4	0402C	CHIPCAP NP0 18P J 50V 0402
C2045	Bottom	D	5	0402C	CHIPCAP NP0 18P J 50V 0402
C2046	Bottom	C	4	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2047	Bottom	C	4	0603C	CHIPCAP X5R 4U7 K 6.3V 0603
C2048	Bottom	C	3	0603C	CHIPCAP X5R 2U2 K 6V3 0603
C2049	Bottom	H	5	0603C	CHIPCAP X5R 1U K 6V3 0603
C2050	Bottom	D	5	0402C	CHIPCAP X7R 10N K 16V 0402
C2051	Bottom	H	5	0603C	CHIPCAP X5R 1U K 6V3 0603
C2052	Bottom	C	5	0402C	CHIPCAP NP0 27P J 50V 0402
C2071	Bottom	Q	3	0402C	CHIPCAP NP0 27P J 50V 0402
C2073	Bottom	S	2	TANT_C_6.2X3.4_H1.7	CHIPTCAP 150U M 10V 6X3.2X1.5
C2074	Bottom	L	2	0402C	CHIPCAP X7R 10N K 16V 0402
C2076	Bottom	Q	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2077	Bottom	M	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2078	Bottom	M	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2079	Bottom	E	4	0402C	CHIPCAP X7R 1N0 K 50V 0402

Item	Side	Grid		Description and value	
C2080	Bottom	E	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2100	Bottom	G	5	0402C	CHIPCAP X7R 33N K 10V 0402
C2101	Bottom	F	5	0402C	CHIPCAP X7R 33N K 10V 0402
C2102	Bottom	H	5	0603C	CHIPCAP X5R 2U2 K 6V3 0603
C2103	Bottom	O	1	0402C	CHIPCAP NP0 27P J 50V 0402
C2104	Bottom	O	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2200	Bottom	M	5	0603C	CHIPCAP X5R 1U K 6V3 0603
C2201	Bottom	M	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2202	Bottom	N	2	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2203	Bottom	M	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2204	Bottom	M	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2205	Bottom	M	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2206	Bottom	M	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2207	Bottom	N	2	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2208	Bottom	N	3	0402C	CHIPCAP NP0 27P J 50V 0402
C2209	Bottom	N	3	0402C	CHIPCAP NP0 22P J 50V 0402
C2210	Bottom	K	3	0603C	CHIPCAP X5R 1U K 16V 0603
C2211	Bottom	K	3	0805C	CHIPCAP X5R 4U7 K 10V 0805
C2212	Bottom	K	3	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2213	Bottom	L	3	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2214	Bottom	L	2	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2215	Bottom	L	2	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2216	Bottom	L	2	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2217	Bottom	M	3	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2219	Bottom	M	2	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2220	Bottom	K	3	0402C	CHIPCAP X5R 1U5 K 4V 0402
C2221	Bottom	K	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2222	Bottom	K	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2223	Bottom	L	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2224	Bottom	M	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2225	Bottom	M	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2226	Bottom	L	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2227	Bottom	K	3	0603C	CHIPCAP X5R 1U K 6V3 0603
C2228	Bottom	L	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2230	Bottom	M	3	0603C	CHIPCAP X5R 1U K 6V3 0603

Item	Side	Grid		Description and value	
C2231	Bottom	K	5	0805C	CHIPCAP X5R 10U M 6V3 0805
C2232	Bottom	L	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2270	Bottom	L	5	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2271	Bottom	L	5	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2272	Bottom	L	5	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2273	Bottom	K	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2274	Bottom	K	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2275	Bottom	K	4	0402C	CHIPCAP X7R 1N0 K 50V 0402
C2281	Bottom	L	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2300	Bottom	J	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2301	Bottom	I	4	0805C	CHIPCAP X5R 22U M 6V3 0805
C2302	Bottom	K	5	0805C	CHIPCAP X5R 22U M 6V3 0805
C2303	Bottom	I	3	0603C	CHIPCAP X5R 1U K 6V3 0603
C2304	Bottom	K	4	0402C	CHIPCAP X7R 10N K 16V 0402
C2305	Bottom	I	2	0603C	CHIPCAP X5R 1U K 6V3 0603
C2306	Bottom	I	4	0603C	CHIPCAP X5R 1U K 6V3 0603
C2307	Bottom	I	4	0603C	CHIPCAP X5R 1U K 6V3 0603
C2309	Bottom	I	5	0805C	CHIPCAP X5R 22U M 6V3 0805
C2312	Bottom	I	3	0603C	CHIPCAP X5R 1U K 6V3 0603
C2313	Bottom	I	3	0603C	CHIPCAP X5R 1U K 6V3 0603
C2314	Bottom	J	2	0805C	CHIPCAP X5R 4U7 K 10V 0805
C2315	Bottom	K	2	0805C	CHIPCAP X5R 4U7 M 25V 0805
C2317	Bottom	J	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2403	Bottom	N	2	0402C	CHIPCAP NP0 47P J 50V 0402
C2404	Bottom	T	2	0402C	CHIPCAP X7R 4N7 K 25V 0402
C2405	Bottom	T	4	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2413	Bottom	I	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2414	Bottom	T	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2415	Bottom	T	4	0402C	CHIPCAP NP0 27P J 50V 0402
C2416	Bottom	T	3	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2417	Bottom	T	3	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2418	Bottom	T	3	0402C	CHIPCAP NP0 27P J 50V 0402
C2700	Bottom	H	2	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2701	Bottom	H	2	0402C	CHIPCAP NP0 27P J 50V 0402
C2800	Bottom	L	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402

Item	Side	Grid		Description and value	
C2801	Bottom	N	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2802	Bottom	M	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2803	Bottom	L	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2804	Bottom	N	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2805	Bottom	K	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2807	Bottom	N	8	0603C	CHIPCAP X5R 1U K 6V3 0603
C2808	Bottom	M	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2809	Bottom	M	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2810	Bottom	K	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2811	Bottom	K	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2812	Bottom	L	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2813	Bottom	N	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2814	Bottom	M	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2815	Bottom	K	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2816	Bottom	K	8	0402C	CHIPCAP NP0 27P J 50V 0402
C2818	Bottom	K	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2819	Bottom	K	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2820	Bottom	N	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C2821	Bottom	N	6	0402C	CHIPCAP NP0 27P J 50V 0402
C2831	Bottom	N	7	0402C	CHIPCAP NP0 1P0 C 50V 0402
C3000	Bottom	I	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3001	Bottom	J	6	0402C	CHIPCAP X7R 10N K 16V 0402
C3002	Bottom	J	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3003	Bottom	K	8	0402C	CHIPCAP X7R 10N K 16V 0402
C3004	Bottom	K	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3005	Bottom	J	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3006	Bottom	I	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3007	Bottom	J	8	0402C	CHIPCAP X7R 10N K 16V 0402
C3008	Bottom	J	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3009	Bottom	I	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3010	Bottom	N	5	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3013	Bottom	K	7	0402C	CHIPCAP NP0 27P J 50V 0402
C3014	Bottom	K	7	0402C	CHIPCAP NP0 68P J 50V 0402
C3100	Bottom	E	2	0402C	CHIPCAP NP0 27P J 50V 0402
C3115	Bottom	O	7	0402C	CHIPCAP X5R 1U K 6V3 0402

Item	Side	Grid		Description and value	
C3116	Bottom	O	7	0402C	CHIPCAP X7R 10N K 16V 0402
C3200	Bottom	G	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3201	Bottom	H	8	0402C	CHIPCAP X5R 1U K 6V3 0402
C3202	Bottom	H	7	0402C	CHIPCAP X7R 10N K 16V 0402
C3203	Bottom	G	8	0402C	CHIPCAP X5R 1U K 6V3 0402
C3204	Bottom	H	7	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3210	Bottom	G	8	0402C	CHIPCAP NP0 27P J 50V 0402
C3211	Top	D	8	0402C	CHIPCAP NP0 27P J 50V 0402
C3300	Bottom	P	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3301	Bottom	N	5	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3302	Bottom	N	4	0402C	CHIPCAP X5R 220N K 6.3V 0402
C3303	Bottom	O	8	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C3304	Bottom	O	8	0402C	CHIPCAP X7R 10N K 16V 0402
C3305	Bottom	O	6	0603C	CHIPCAP X5R 4U7 K 6.3V 0603
C3306	Bottom	O	8	0603C	CHIPCAP X5R 4U7 K 6.3V 0603
C3307	Bottom	O	8	0603C	CHIPCAP X5R 10UF 6V3 0603
C3308	Bottom	N	5	0402C	CHIPCAP X5R 1U K 6V3 0402
C3309	Bottom	N	5	0402C	CHIPCAP NP0 27P J 50V 0402
C3310	Bottom	P	6	0402C	CHIPCAP NP0 27P J 50V 0402
C3313	Bottom	O	8	0402C	CHIPCAP X7R 10N K 16V 0402
C3314	Bottom	P	8	0402C	CHIPCAP X7R 10N K 16V 0402
C6020	Bottom	T	2	0402C	CHIPCAP NP0 1P5 C 50V 0402
C6031	Bottom	R	1	0402C	CHIPCAP NP0 18P J 50V 0402
C6032	Bottom	P	2	0402C	CHIPCAP NP0 100P J 50V 0402
C6033	Bottom	P	2	0402C	CHIPCAP X7R 10N K 16V 0402
C6034	Bottom	P	2	0402C	CHIPCAP X7R 10N K 16V 0402
C6035	Bottom	P	1	0402C	CHIPCAP X7R 10N K 16V 0402
C6036	Bottom	P	2	0402C	CHIPCAP X7R 10N K 16V 0402
C6037	Bottom	P	2	0402C	CHIPCAP X5R 1U5 K 4V 0402
C6038	Bottom	Q	1	0402C	CHIPCAP X7R 10N K 16V 0402
C6039	Bottom	Q	2	0402C	CHIPCAP NP0 18P J 50V 0402
C6040	Bottom	P	2	0402C	CHIPCAP X5R 1U K 6V3 0402
C6051	Bottom	Q	2	0402C	CHIPCAP NP0 2P7 C 50V 0402
C6052	Bottom	Q	2	0402C	CHIPCAP NP0 2P7 C 50V 0402
C6055	Bottom	Q	2	0603C	CHIPCAP X5R 1U K 6V3 0603

Item	Side	Grid		Description and value	
C6100	Bottom	G	7	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C6101	Bottom	H	6	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C6102	Bottom	G	7	0402C	CHIPCAP X7R 10N K 16V 0402
C6103	Bottom	G	7	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C6104	Bottom	H	6	0402C	CHIPCAP NP0 47P J 50V 0402
C6105	Bottom	G	6	0402C	CHIPCAP NP0 100P J 50V 0402
C6106	Bottom	H	6	0402C	CHIPCAP NP0 27P J 50V 0402
C6107	Bottom	H	6	0405_2_P0.65_AVX	CHIP ARRAY X5R 2X100N M 10V 0405
C6108	Bottom	H	6	0405_2_P0.65_AVX	CHIP ARRAY X5R 2X100N M 10V 0405
C6109	Bottom	G	6	0402C	CHIPCAP X5R 1U5 K 4V 0402
C7000	Bottom	U	8	0402C	CHIPCAP NP0 1P5 C 50V 0402
C7001	Bottom	T	8	0402C	CHIPCAP NP0 1P5 C 50V 0402
C7010	Bottom	N	5	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C7011	Bottom	N	4	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C7012	Bottom	N	5	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C7013	Bottom	N	4	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C7501	Bottom	S	5	0402C	CHIPCAP NP0 2P7 C 50V 0402
C7502	Bottom	Q	5	0402C	CHIPCAP NP0 0P5 C 50V 0402
C7503	Bottom	Q	4	0603C	CHIPCAP X5R 1U K 6V3 0603
C7504	Bottom	S	5	0603C	CHIPCAP X5R 1U K 6V3 0603
C7505	Bottom	Q	4	0402C	CHIPCAP X5R 1U K 6V3 0402
C7506	Bottom	Q	4	0402C	CHIPCAP X5R 1U K 6V3 0402
C7507	Bottom	Q	4	0402C	CHIPCAP X7R 10N K 16V 0402
C7508	Bottom	Q	5	0402C	CHIPCAP NP0 18P J 50V 0402
C7509	Bottom	R	4	0402C	CHIPCAP X7R 10N K 16V 0402
C7511	Bottom	R	4	0603C	CHIPCAP NP0 2N2 G 16V 0603
C7513	Bottom	Q	4	0402C	CHIPCAP X7R 10N K 16V 0402
C7515	Bottom	S	4	0402C	CHIPCAP NP0 4P7 C 50V 0402
C7516	Bottom	S	4	0402C	CHIPCAP NP0 470P J 50V 0402
C7518	Bottom	Q	5	0402C_H0.6	CHIPCAP X5R 100N K 16V 0402
C7520	Bottom	S	8	0402C	CHIPCAP NP0 3P3 C 50V 0402
C7521	Bottom	S	8	0402C	CHIPCAP NP0 1P5 C 50V 0402
C7522	Bottom	Q	8	0402C	CHIPCAP NP0 1P8 C 50V 0402

Item	Side	Grid		Description and value	
C7523	Bottom	S	8	0402C	CHIPCAP X5R 1U K 6V3 0402
C7524	Bottom	Q	7	0402C	CHIPCAP X5R 1U K 6V3 0402
C7525	Bottom	Q	9	0402C	CHIPCAP NP0 18P J 50V 0402
C7560	Bottom	R	3	0402C	CHIPCAP NP0 1P2 C 50V 0402
C7561	Bottom	R	4	0402C	CHIPCAP X7R 820P J 50V 0402
C7562	Bottom	Q	6	0402C	CHIPCAP NP0 39P J 50V 0402
C7563	Bottom	Q	5	0402C	CHIPCAP NP0 47P J 50V 0402
C7564	Bottom	S	4	0402C	CHIPCAP X7R 10N K 16V 0402
C7565	Bottom	Q	5	0402C	CHIPCAP NP0 47P J 50V 0402
C7566	Bottom	R	4	0402C	CHIPCAP NP0 4P7 C 50V 0402
D2200	Bottom	L	3	TFBGA_108	RETU 3.02 LF TSA1GJWE TFBGA108
D2800	Bottom	L	7	UBGA_289	RAPGSM PA v1.1 LF C027 uBGA289
D3000	Bottom	J	7	FBGA133_11.1X10.1	COMBO 256M NOR + 128M DDR DRAM FBGA133
D3300	Bottom	O	7	TFBGA84	HW ACCELERATOR STV0984N
E2001	Bottom	D	4	PICK_PLACE_9900821	No description in PDM
E2002	Bottom	A	6	PICK_PLACE_9900821	No description in PDM
E2003	Bottom	D	4	PICK_PLACE_9900821	No description in PDM
E2010	Bottom	A	7	PICK_PLACE_9900821	No description in PDM
E2070	Bottom	P	3	PICK_PLACE_9900821	No description in PDM
E2071	Bottom	P	3	PICK_PLACE_9900821	No description in PDM
E2075	Bottom	P	4	PICK_PLACE_9900821	No description in PDM
E2101	Bottom	Q	6	CLIP_040_034164	No description in PDM
E2102	Bottom	Q	9	CLIP_040_034164	No description in PDM
E2103	Bottom	U	6	BT_PAD_9900503	No description in PDM
E2104	Bottom	T	6	BT_PAD_9900503	No description in PDM
E2105	Bottom	U	7	BT_PAD_9900503	No description in PDM
E2106	Bottom	T	6	BT_PAD_9900503	No description in PDM
E2401	Top	C	9	PICK_PLACE_9900821	No description in PDM
E2402	Top	C	1	PICK_PLACE_9900821	No description in PDM
E2403	Top	N	1	PICK_PLACE_9900821	No description in PDM
E2405	Top	T	9	PICK_PLACE_9900821	No description in PDM
E2407	Top	N	9	PICK_PLACE_9900821	No description in PDM
E2506	Top	T	1	PICK_PLACE_9900821	No description in PDM

Item	Side	Grid		Description and value	
E6001	Bottom	T	1	CLIP_040_034164	No description in PDM
E6003	Bottom	T	1	CLIP_040_034164	No description in PDM
E7000	Bottom	U	8	PICK_PLACE_9900821	No description in PDM
E7001	Bottom	U	5	PICK_PLACE_9900821	No description in PDM
E7501	Bottom	T	9	CLIP_040_034164	No description in PDM
E7502	Bottom	T	9	CLIP_040_034164	No description in PDM
E7503	Bottom	U	8	CLIP_040_034164	No description in PDM
F2000	Top	A	5	0402_FUSE_AVX_H0.5	SM FUSE FF 2A 32V 0402
G2200	Bottom	C	2	BATTER_EECEP	RTC BACKUP CAPAC 311 SIZE FOR 2.6V 4UAH
G7500	Bottom	S	4	VCO_DCS02733	VCO 3296-3980MHZ 4-BAND
G7501	Bottom	Q	3	NKG3176B_H1.0	VCTCXO 38.4MHZ 2.5V 2MA
L2000	Top	A	5	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2030	Bottom	C	5	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2031	Bottom	C	4	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2032	Bottom	D	5	COIL_LK_1608	CHIP COIL 68NH J Q12/100MHZ 0603
L2033	Bottom	D	5	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2034	Bottom	D	5	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2035	Bottom	C	5	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2102	Bottom	Q	7	COIL_LQW1608	CHIP COIL 56N J Q38/200MHZ 0603
L2103	Bottom	Q	8	COIL_LQW1608	CHIP COIL 56N J Q38/200MHZ 0603
L2104	Top	A	7	0405_2_H1.0	CHIP BEAD ARRAY 2X1000R 0R75 0405
L2105	Bottom	O	2	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2106	Bottom	O	2	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2202	Bottom	M	2	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2207	Bottom	N	4	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402

Item	Side	Grid		Description and value	
L2208	Bottom	N	4	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2209	Bottom	M	5	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2210	Bottom	M	5	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2211	Bottom	M	4	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2212	Bottom	M	4	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2270	Bottom	L	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2271	Bottom	L	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2272	Bottom	K	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2273	Bottom	K	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2301	Bottom	I	4	0603_BLM	FERR.BEAD 220R/100M 2A 0R05 0603
L2302	Bottom	J	4	CHOKE_SER400_H1.2	INDUCT WW 10U 0A65 0R35 4X4X1.2
L2304	Bottom	J	2	CHOKE_SER300_H1.5	CHOKE 22U M 0R7 0.35A 3.0X3.0X1.5
L2305	Bottom	I	3	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2306	Bottom	I	3	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2402	Bottom	T	3	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2403	Bottom	J	2	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L2404	Bottom	T	3	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L2405	Bottom	O	2	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L3200	Bottom	G	8	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L3301	Bottom	N	6	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402

Item	Side	Grid		Description and value	
L3303	Bottom	P	8	CHOKE_SER300	INDUCT WW 2.2UH 1A2 0R168 310 case size
L3304	Bottom	O	9	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L6030	Bottom	Q	2	0402L	CHIP COIL 2N7 +-0N3 Q29/800M 0402
L6031	Bottom	Q	2	0402L	CHIP COIL 2N7 +-0N3 Q29/800M 0402
L6032	Bottom	Q	1	0402L	CHIP COIL 22N J Q28/800MHZ 0402
L6077	Bottom	R	2	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L6100	Bottom	G	7	0402LQW	CHIP COIL 47N +-3% Q25/200MHz 0402
L6101	Bottom	H	6	0402L_POL2	CHIP COIL 120NH J Q8/100MHZ 0402
L7010	Bottom	N	5	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L7011	Bottom	N	4	0402L	FERR.BEAD 240R/100M 0.4A 0R4 0402
L7500	Bottom	S	6	0402L	CHIP COIL 12N J Q31/800MHZ 0402
L7501	Bottom	S	6	0402L	CHIP COIL 12N J Q31/800MHZ 0402
L7502	Bottom	Q	5	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
L7503	Bottom	Q	8	0402L	CHIP COIL 27N J Q27/800MHZ 0402
L7504	Bottom	R	6	0402L	CHIP COIL 22N J Q28/800MHZ 0402
L7505	Bottom	R	6	0402L	CHIP COIL 22N J Q28/800MHZ 0402
L7515	Bottom	S	4	0402L	CHIP COIL 15N J Q30/800MHZ 0402
L7561	Bottom	Q	6	COIL_HK_1608	CHIP COIL 470NH J 0603
M2100	Bottom	C	8	VIBRA_M_KHN4NX1RA	SMD VIBRA MOTOR 1.3V 90MA 9000RPM
N2030	Bottom	D	5	CSP_8_2.118X1.118	IC ANALOG SWITCH SPDT LOW THRESHOLD CSP8
N2031	Bottom	C	3	XBGA_N14	ST HEADPHONE AMPLIFIER LM4920 uSMD14

Item	Side	Grid		Description and value	
N2300	Bottom	J	3	TFBGA_84_6.15X6.15	TAHVO v5.2 LF TFBGA84
N2301	Bottom	J	2	USMD8_1.69X1.69	WHITE LED DRIVER 4LEDS 500mW 8bump USMD8
N2401	Bottom	G	5	SOT_666	TRX2+RX4 PEMD9 N&P 10K/47K 0W12 SOT666
N3200	Bottom	G	8	USMD16_2.03X2.03	VREG & LEVELSHIFT(LP3928) USMD16
N3300	Bottom	O	8	USMD5_1.417X1.087	DC/DC CONV LM3671TLX-1.82V uSMD5
N3301	Bottom	O	6	USMD5_1.47X1.04_H0.675	VREG LP3985ITLX-2.8 NOPB USMD5
N6030	Bottom	P	2	CSP_47_3.85X4.05	BC4-ROM1.0RDL
N6100	Bottom	H	7	WLCSP25_3.1X2.9	FM RECEIVER TEA5760 N1C
N7505	Bottom	R	5	TFBGA144	AHNE401A TRANSCEIVER TFBGA144
N7520	Bottom	R	8	RF9282E3.6	PA RF9282E6.5 GSM/EDGE 850/900/1800/1900
R2007	Bottom	C	2	UBGA11_1.6X2.15	ASIP SILIC USB OTG / ESD BGA11
R2008	Bottom	C	2	0402R	CHIPRES 0W06 220K J 0402
R2033	Bottom	E	5	0402R	CHIPRES 0W06 10K J 0402
R2034	Bottom	E	5	0402R	CHIPRES 0W06 100R J 0402
R2035	Bottom	D	5	0402R	CHIPRES 0W06 100K J 0402
R2036	Bottom	D	5	0402R	CHIPRES 0W06 10K J 0402
R2044	Bottom	H	5	0402R	CHIPRES 0W06 220R J 0402
R2045	Bottom	E	5	0402R	CHIPRES 0W06 2K2 J 0402
R2049	Bottom	D	4	0402R	CHIPRES 0W06 15R J 0402
R2050	Bottom	C	4	0402R	CHIPRES 0W06 15R J 0402
R2051	Bottom	C	5	FC5_1.1X1.1	ASIP TVS 4-CH BI ESD 14V 15pF 400um BGA5
R2052	Bottom	C	4	0402R	CHIPRES 0W06 100K J 0402
R2070	Bottom	E	2	0402_NTH5	NTC RES 0W1 47K J B 4050+-3% 0402
R2071	Bottom	N	2	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402
R2072	Bottom	E	4	0402R	CHIPRES 0W06 2K2 J 0402
R2074	Bottom	E	5	0402R	CHIPRES 0W06 100R J 0402
R2100	Bottom	H	5	FLIP_CHIP_8_1.7X1.7	ASIP SINGLE ENDED MICROPHONE INTERF BGA8

Item	Side	Grid		Description and value	
R2101	Bottom	H	5	0402R	CHIPRES 0W06 220R J 0402
R2102	Bottom	T	5	0402R	CHIPRES 0W06 10R J 0402
R2103	Bottom	T	5	0402R	CHIPRES 0W06 10R J 0402
R2104	Top	A	8	0402R	CHIPRES JUMPER 0R0 0402
R2105	Top	A	8	0402R	CHIPRES JUMPER 0R0 0402
R2106	Bottom	N	5	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402
R2107	Bottom	N	5	0402_VAR	CHIP VARISTOR VWM14V VC50V 0402
R2200	Bottom	M	2	0402R	CHIPRES 0W06 100K J 0402
R2201	Bottom	N	2	0402R	CHIPRES 0W06 120K J 0402
R2202	Bottom	M	5	0402R	CHIPRES JUMPER 0R0 0402
R2203	Bottom	M	5	0402R	CHIPRES JUMPER 0R0 0402
R2204	Bottom	M	5	0402R	CHIPRES JUMPER 0R0 0402
R2205	Bottom	M	5	0402R	CHIPRES JUMPER 0R0 0402
R2212	Bottom	L	4	0402R	CHIPRES 0W06 470R J 0402
R2213	Bottom	N	3	0402R	CHIPRES 0W06 4K7 J 0402
R2216	Bottom	N	3	0402R	CHIPRES 0W06 2M2 J 0402
R2250	Bottom	N	2	0402R	CHIPRES 0W06 100K J 0402
R2251	Bottom	N	2	0402R	CHIPRES 0W06 100K J 0402
R2303	Bottom	H	3	0603R	CHIPRES JUMPER 0R0 0603
R2400	Bottom	G	4	0603R	CHIPRES JUMPER 0R0 0603
R2406	Bottom	N	2	0402R	CHIPRES 0W06 27K J 0402
R2407	Bottom	H	5	0402R	CHIPRES 0W06 47R J 0402
R2408	Bottom	G	4	0402R	CHIPRES 0W06 22K J 0402
R2418	Bottom	H	4	0402R	CHIPRES 0W06 470R J 0402
R2419	Bottom	H	5	0402R	CHIPRES 0W06 470R J 0402
R2421	Bottom	K	2	0402R	CHIPRES 0W06 33R J 0402
R2422	Bottom	G	5	0402R	CHIPRES JUMPER 0R0 0402
R2423	Bottom	G	5	0402R	CHIPRES 0W06 22K J 0402
R2424	Bottom	I	4	0402R	CHIPRES 0W06 27R J 0402
R2425	Bottom	G	4	0402R	CHIPRES 0W06 1K0 J 0402
R2426	Bottom	N	9	0402R	CHIPRES 0W06 47R J 0402
R2427	Bottom	L	1	0402R	CHIPRES 0W06 47R J 0402
R2430	Bottom	G	4	0402R	CHIPRES 0W06 22K J 0402

Item	Side	Grid		Description and value	
R2803	Bottom	L	8	0402R	CHIPRES 0W06 100R J 0402
R2804	Bottom	L	8	0402R	CHIPRES 0W06 100R J 0402
R3000	Bottom	J	6	0402R	CHIPRES 0W06 4K7 J 0402
R3002	Bottom	L	8	0402R	CHIPRES 0W06 10R J 0402
R3003	Bottom	K	6	0402R	CHIPRES 0W06 4K7 J 0402
R3004	Bottom	K	7	0402R	CHIPRES 0W06 4K7 J 0402
R3200	Bottom	G	8	UBGA11_1.62X2.12	ASIP MMC FILTER *** PB-FREE ***
R3201	Bottom	H	8	0402R	CHIPRES 0W06 100K J 0402
R3202	Bottom	H	8	0402R	CHIPRES 0W06 100K J 0402
R3203	Bottom	H	7	0402R	CHIPRES 0W06 100K J 0402
R3204	Bottom	H	7	0402R	CHIPRES 0W06 2K2 J 0402
R3205	Bottom	G	8	0402R	CHIPRES 0W06 680R J 0402
R3206	Bottom	G	8	0402R	CHIPRES 0W06 1K2 J 0402
R3300	Bottom	P	7	0402R	CHIPRES 0W06 4K7 J 0402
R3301	Bottom	P	8	0402R	CHIPRES 0W06 4K7 J 0402
R3305	Bottom	O	7	0402R	CHIPRES JUMPER 0R0 0402
R3306	Bottom	P	7	0402R	CHIPRES 0W06 100R J 0402
R3307	Bottom	P	7	0402R	CHIPRES 0W06 100R J 0402
R3312	Bottom	I	8	0402R	CHIPRES 0W06 1K0 J 0402
R3313	Bottom	I	8	0402R	CHIPRES 0W06 1K0 J 0402
R3314	Bottom	O	6	0402R	CHIPRES 0W06 47R J 0402
R6005	Bottom	N	2	0402R	CHIPRES 0W06 100K J 0402
R6020	Bottom	T	2	FERRIT_0402	CHIPRES JUMPER 0R0 0402
R6030	Bottom	P	2	0402R	CHIPRES 0W06 10K J 0402
R6031	Bottom	Q	1	0402R	CHIPRES 0W06 10K J 0402
R6032	Bottom	P	2	0402R	CHIPRES 0W06 2R2 J 0402
R6034	Bottom	Q	2	0402R	CHIPRES 0W06 10K J 0402
R6037	Bottom	Q	1	0402R	CHIPRES 0W06 100K J 0402
R6100	Bottom	G	7	0402R	CHIPRES 0W06 100K J 0402
R6101	Bottom	G	7	0402R	CHIPRES 0W06 10K J 0402
R6102	Bottom	H	7	0402R	CHIPRES JUMPER 0R0 0402
R6103	Bottom	G	6	0402R	CHIPRES 0W06 22R J 0402
R6104	Bottom	G	7	0402R	CHIPRES JUMPER 0R0 0402
R6105	Bottom	G	6	0402R	CHIPRES JUMPER 0R0 0402
R7001	Bottom	T	8	0402R	CHIPRES JUMPER 0R0 0402

Item	Side	Grid		Description and value	
R7002	Bottom	T	8	0402R	CHIPRES JUMPER 0R0 0402
R7501	Bottom	R	4	0402R	CHIPRES 0W06 2K2 J 0402
R7502	Bottom	S	5	0402R	CHIPRES 0W06 10K F 0402
R7503	Bottom	Q	5	0402R	CHIPRES 0W06 4K7 J 0402
R7505	Bottom	R	4	0402R	CHIPRES 0W06 8K2 F 0402
R7506	Bottom	R	5	0402R	CHIPRES 0W06 10R J 0402
R7507	Bottom	S	5	0402R	CHIPRES 0W06 10R J 0402
R7508	Bottom	R	4	0402R	CHIPRES 0W06 10R J 0402
R7509	Bottom	Q	4	0402R	CHIPRES 0W06 22K J 0402
R7510	Bottom	Q	8	0402R	CHIPRES 0W06 15R J 0402
R7522	Bottom	Q	8	0402R	CHIPRES 0W06 27K J 0402
R7523	Bottom	S	8	0402R	CHIPRES JUMPER 0R0 0402
R7560	Bottom	Q	6	0402R	CHIPRES 0W06 100R J 0402
S2401	Bottom	O	1	SWITCH_EVQP7A01K	SM SW TACT SPST 12V SIDE KEY 2.2N
S2402	Bottom	S	1	SWITCH_EVQP7A01K	SM SW TACT SPST 12V SIDE KEY 2.2N
S2403	Top	U	5	SWITCH_EVQP7A01K	SM SW TACT SPST 12V SIDE KEY 2.2N
T7501	Bottom	R	3	TRANS_HHM1517A2	TRANSF BALUN 3800 +/- 550MHZ 0805
T7520	Bottom	S	9	TRANS_LDB15	TRANSF BALUN 1800+-100MHZ 2X1.25
V2000	Top	A	4	BGA_4	ASIP TVS BGA4
V2401	Bottom	H	4	SOT_666	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666
V2402	Bottom	G	5	SOT_666	TRX2+RX4 N 4K7/47K SOT666
V2405	Top	G	4	LED_48_21SYGC	LED WHITE 140MCD 5MA 0603
V2406	Top	G	6	LED_48_21SYGC	LED WHITE 140MCD 5MA 0603
V2407	Top	C	6	LED_48_21SYGC	LED WHITE 140MCD 5MA 0603
V2409	Top	C	4	LED_48_21SYGC	LED WHITE 140MCD 5MA 0603
V2410	Bottom	H	4	SC79	SCH DI 1PS79SB31 200MA 30V SOD523
V2411	Bottom	H	4	SOT_666	TRX2 BIPOLAR 2XPNP 40V 0A1 0W12 SOT666
V2412	Bottom	M	1	LED_CL_194WH_D_BIG	LED TOP BLUE 5MA min30mcd 0603 max0.4mm

Item	Side	Grid		Description and value	
V2413	Bottom	M	9	LED_CL_194WH_D_BIG	LED TOP BLUE 5MA min30mcd 0603 max0.4mm
X1001	Bottom	U	3	CON_24R_JANK_P0.4	CONN BTB 2X12 F P0.4 30V 0.2A
X2000	Bottom	A	7	CON_JACK_HR33NK_2DJA_2S	CONN CHR DIA 2.0MM COMPRESS
X2002	Bottom	B	3	CON_UX60SC_MB_5ST_1.2L	CONN USB 5POL MINI-USB B TYPE P0.8
X2030	Bottom	B	5	CON_T389093_A1	SMD CONN AUD/VID 4POL 30V 2A, 2.5mm DIA
X2060	Top	A	3	TRACEABILITY_PAD	MODULE ID COMPONENT 2.8X1.8X0.3
X2070	Bottom	O	3	LYNX_BATT_CONN_H7.0	SM BATTERY CONN 3POL SPR 12V 2A
X2700	Bottom	G	3	SIM_CONN_M_SK_200500165_H1.7	CONN SIM SM 6POL P2.54 H1.05
X3200	Bottom	E	7	MOLEX_RSD_501885	CONN SMC TRANSFLASH MMC
X3300	Bottom	P	5	SMIA85	SMIA85 SOCKET
X7000	Bottom	T	8	RF_SWITCH_MS_156	SM CONN RF JACK 50R 2W 6GHZ
Z2001	Bottom	C	2	FERRITE_0402	FERRITE BEAD 0.6R 600R/100MZ 0402
Z2400	Bottom	H	4	BGA24_P0.4_H0.67	ASIP 10-CH LCD FILTER W/ESD BGA24
Z2401	Top	U	4	SWLP_18_2.01X1.66	ASIP 7-CH LCD FILTER W/ESD BGA18
Z2402	Bottom	R	2	SWLP_18_2.01X1.66	ASIP 7-CH LCD FILTER W/ESD BGA18
Z2700	Bottom	H	2	SWLP8_1.21X1.21	ASIP SIM ESD/EMI FILT 400UM BGA8
Z6030	Bottom	R	2	EZFVQ42NM61S	LTCC FILT 2441.75+-41.75MHZ 2.5X2
Z7001	Bottom	T	8	DEA101910DT	PHASESHIFTER-60°@1850 GSM850...1900 0402
Z7002	Bottom	T	8	DEA101910DT	PHASESHIFTER-60°@1850 GSM850...1900 0402
Z7501	Bottom	S	7	FILTER_2.1X1.7_10P_H0.6	DUAL RX SAW FILTER 1800/1900 MHz 2016
Z7503	Bottom	Q	6	MODULE_SP_LMZ_137	SAW MODULE TX GSM 850/900MHz 4.5x3.2
Z7504	Bottom	R	7	FILTER_2.1X1.7_10P_H0.65	DUAL RX SAW FILTER 850/900 MHz 2016

Item	Side	Grid		Description and value	
Z7520	Bottom	S	7	FERRITE_FBMJ1608	FERRITE BEAD 0R01 28R/100MHZ 0603

Swap units

Table 6 Swap phones

Note: For product codes, please refer to the latest Service bulletin.

Swap phones
EMEA
RM-217 SWAP TRX EURO-C BLKSILVER LATIN
RM-217 SWAP TRX EURO-C FR BLKSILV LATIN
RM-217 SWAP TRX EURO-C TR BLKSILV LATIN
RM-217 SWAP TRX EURO-I UKRAIN BLKSLV CYR
RM-217 SWAP TRX EURO-I RU BLKSILV CYR
RM-217 SWAP TRX MEA-13 BLKSILVER LATIN
RM-217 SWAP TRX EURO-F BLKSILVER HEBREW
RM-217 SWAP TRX EURO-H BLKSILVER GREEK
RM-217 SWAP TRX MEA-1 BLKSILVER ARABIC

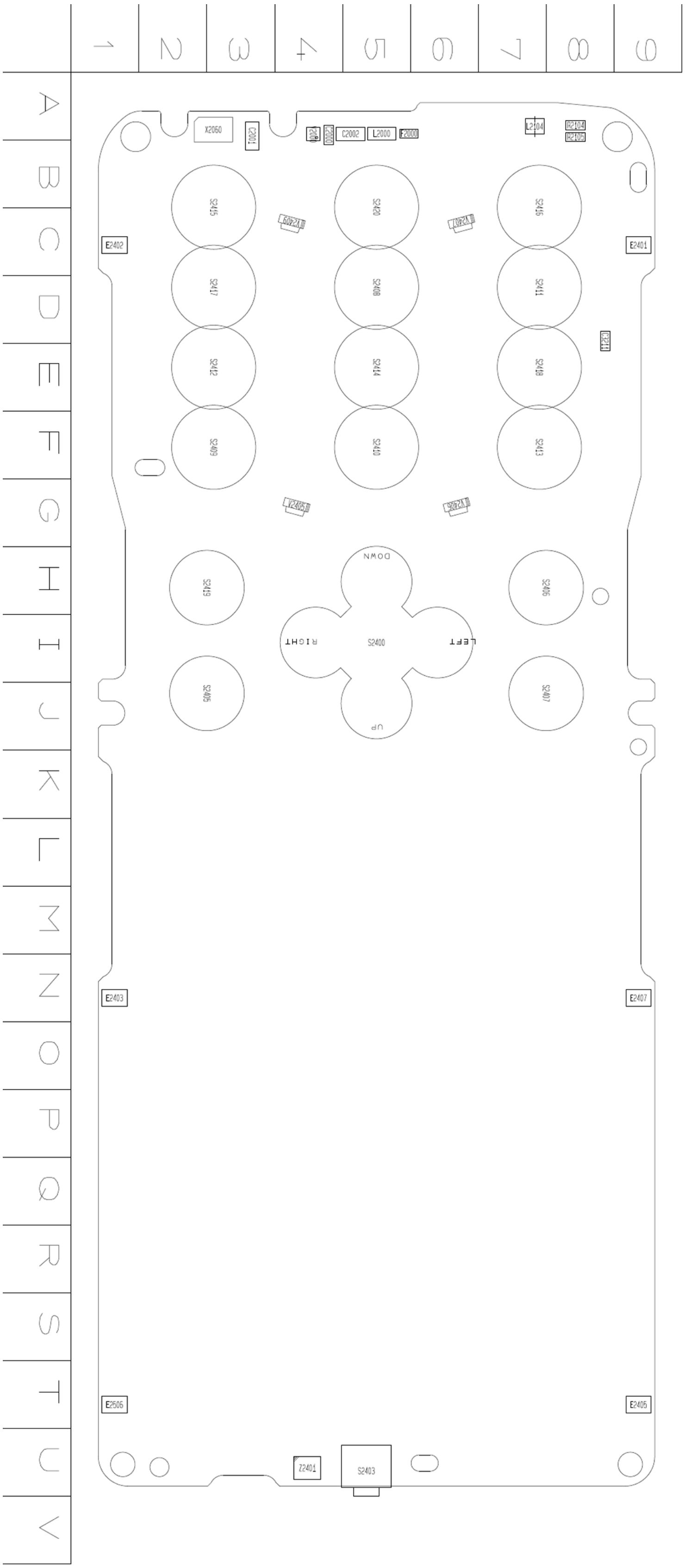
Table 7 Lightswap

Note: For product codes, please refer to the latest Service bulletin.

Lightswap
EMEA
RM-217 LIGHTSWAP ENGINE EURO-C
RM-217 LIGHTSWAP ENGINE EURO-C FR
RM-217 LIGHTSWAP ENGINE EURO-C TR LATIN
RM-217 LIGHTSWAP ENGINE EURO-I UKRAI CYR
RM-217 LIGHTSWAP ENGINE EURO-I RU CYR
RM-217 LIGHTSWAP ENGINE MEA-13 LATIN
APAC
RM-217 LIGHTSWAP ENGINE APAC-U
RM-217 LIGHTSWAP ENG APAC-T PHILLIP LAT
China
RM-217 LIGHTSWAP ENGINE APAC-R
RM-217 LIGHTSWAP ENGINE APAC-P
RM-217 LIGHTSWAP ENGINE CHINA-Q HONGKONG

Component layouts

Component layout - top (1ywa_32a)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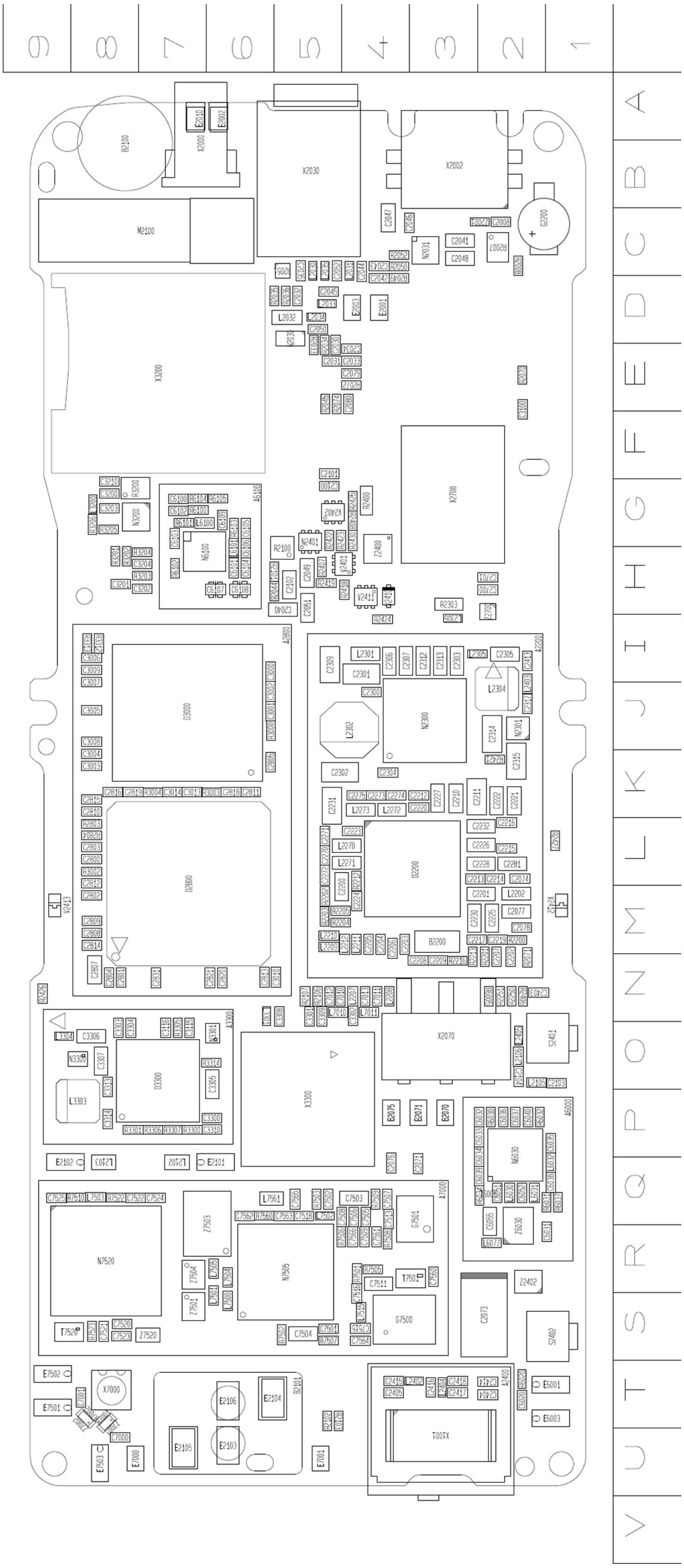
C2001
C2000
C2002
L2000
F2000
L2104
R2104
R2105
E2402
E2401
S2415
S2420
S2416
V2409
V2407
S2417
S2408
S2411
C3211
S2412
S2414
S2418
S2409
S2410
S2413
V2405
V2406
DOWN
S2419
S2406
RIGHT
S2400
LEFT
S2405
S2407
UP
E2403
E2407
E2506
E2405
Z2401
S2403

Component layout - bottom (1ywa_32a)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X2000
X2030
X2002
G2200
M2100
X3200
X2700
N3200
N6100
D3000
D2800
N2300
L2304
L2302
D2200
B2200
D3300
L3303
X3300
X2070
S2401
N6030
N7520
Z7503
N7505
G7501
G7500
C2073
Z2402
S2402
X7000
E2106
E2104
E2105
E2103
T001X
E6001
E6003

3 — Service Software Instructions

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■ *Phoenix* installation steps in brief

Prerequisites

Recommended hardware requirements:

- Computer processor: Pentium 700 MHz or higher
- RAM 256 MB
- Disk space 100-300 MB

Supported operating systems:

- *Windows 2000* Service Pack 3 or higher
- *Windows XP* Service Pack 1 or higher

Context

Phoenix is a service software for reprogramming, testing and tuning phones.

Phoenix installation contains:

- Service software support for all phone models included in the package
- Flash update package files for programming devices
- All needed drivers for:
  - PKD-1 (DK2) dongle
  - DKU-2 USB cable

Note: Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless there are updates between *Phoenix* service software releases. If separate update packages are used, they should be used after *Phoenix* and data packages have been installed.

The phone model specific data package includes all changing product specific data:

- Product software binary files
- Files for type label printing
- Validation file for the faultlog repair data reporting system
- All product specific configuration files for *Phoenix* software components

Note: *Phoenix* and phone data packages should only be used as complete installation packages. Uninstallation should be made from the *Windows* Control Panel.

To use *Phoenix*, you need to:

Steps

1. Connect a PKD-1 (DK2) dongle to the computer parallel port.
2. Install *Phoenix*.
3. Install the phone-specific data package.
4. Configure users.
5. Manage connection settings (depends on the tools you are using).
   - Update FPS-10 software

     Note: There is no need to activate FPS-10.
   - Activate SX-4 smart card, if you need tuning and testing functions.

     Note: When FPS-10 is used only for product software updates, SX-4 smart card is not needed.

Results

Phoenix is ready to be used with FPS-10 flash prommer and other service tools.

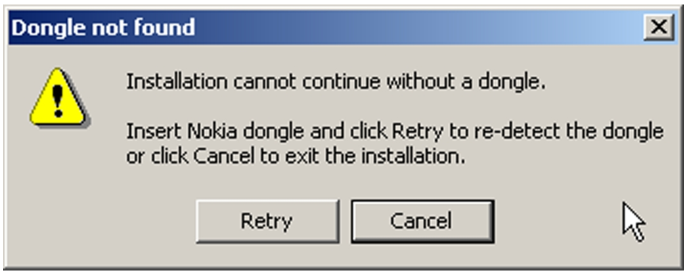
Installing *Phoenix*

Prerequisites

- Check that a dongle is attached to the parallel port of your computer.
- Download the *Phoenix* installation package (for example, *phoenix_service_sw_2004_39_x_xx.exe*) to your computer (in *C:|TEMP*, for instance).
- Close all other programs.
- Depending on your operating system, administrator rights may be required to install *Phoenix*.
- If uninstalling or rebooting is needed at any point, you will be prompted by the InstallShield program.

Context

At some point during the installation procedure, you may get the following message:



Dongle not found

Installation cannot continue without a dongle.

Insert Nokia dongle and click Retry to re-detect the dongle or click Cancel to exit the installation.

Figure 2 Dongle not found

This may be a result of a defective or too old PKD-1 dongle.

Check the COM/parallel ports used. After correcting the problem, you can restart the installation.

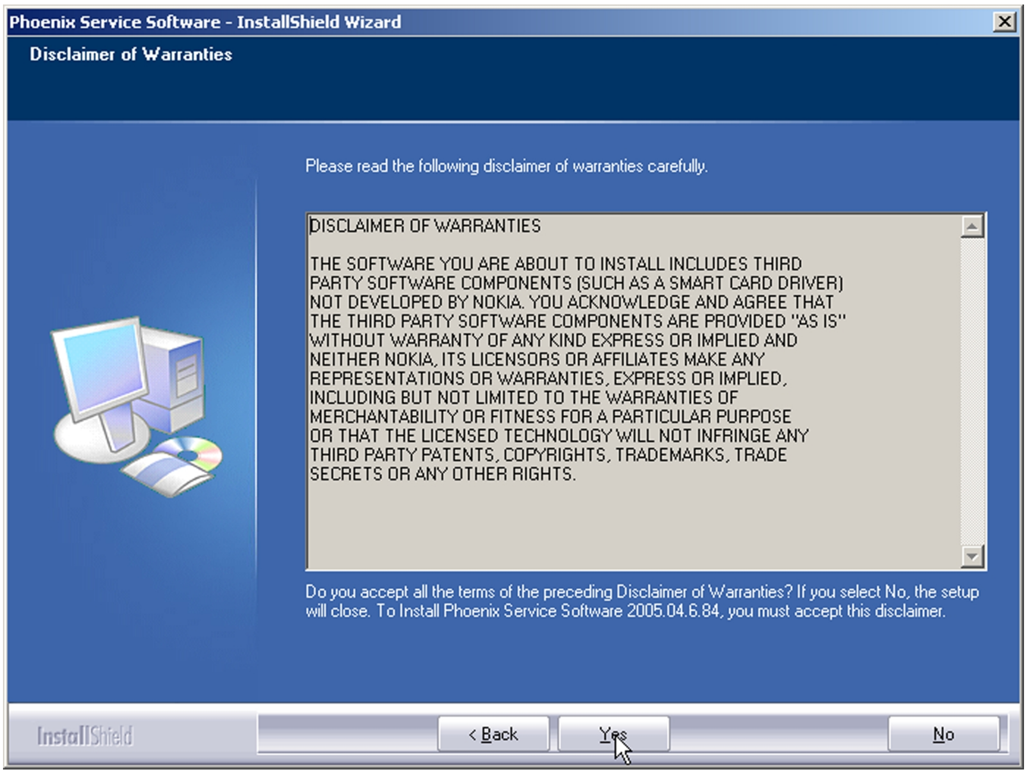
For more detailed information, please refer to *Phoenix* Help files.

> **Tip:** Each feature in *Phoenix* has its own Help function, which can be activated while running the program. Press the **F1** key or the feature's **Help** button to activate a Help file.

Steps

1. To start the installation, run the application file (for example,*phoenix_service_sw_2004_39_x_xx.exe*).
2. In the *Welcome* dialogue, click **Next**.

3. Read the disclaimer text carefully and click **Yes**.



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Do you accept all the terms of the preceding Disclaimer of Warranties? If you select No, the setup will close. To Install Phoenix Service Software 2005.04.6.84, you must accept this disclaimer.

Figure 3 Disclaimer text

4. Choose the destination folder.

   The default folder *C:|ProgramFiles|Nokia|Phoenix* is recommended.
5. To continue, click **Next.**

   To choose another location, click **Browse** (not recommended).
6. Wait for the components to be copied.

   The progress of the installation is shown in the *Setup Status* window.
7. Wait for the drivers to be installed and updated.

   The process may take several minutes to complete.

   If the operating system does not require rebooting, the PC components are registered right away.

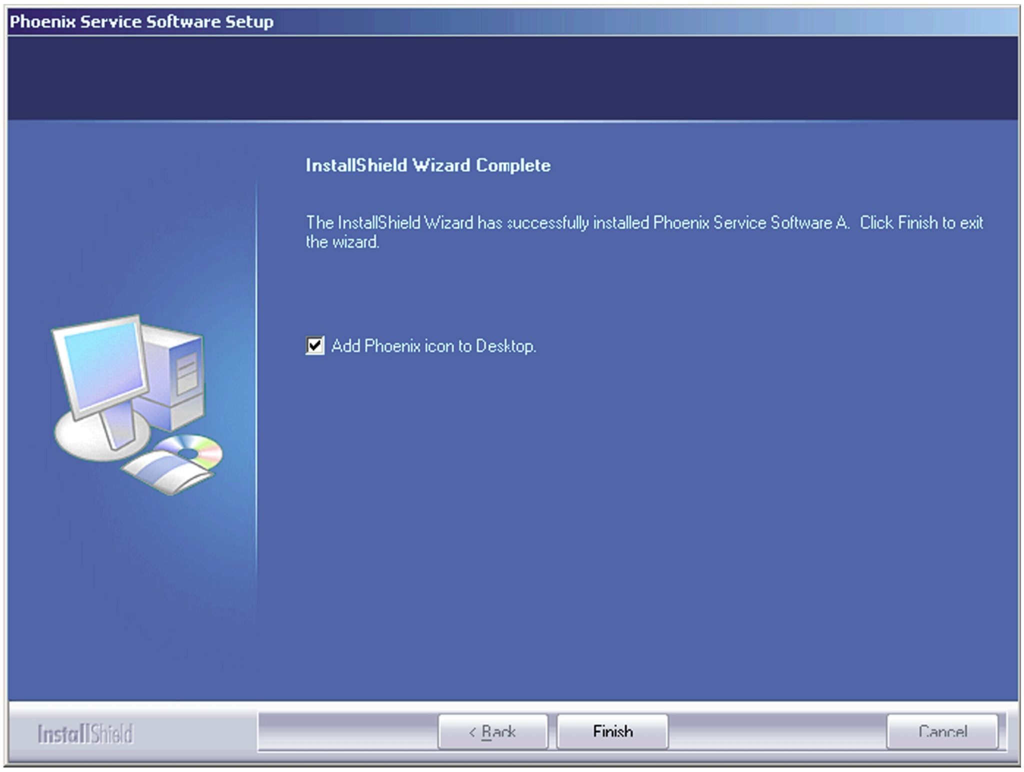
   If the operating system requires restarting your computer, the Install Shield Wizard will notifies about it.

   Select **Yes...** to reboot the PC immediately or **No...** to reboot the PC manually afterwards.

   After the reboot, all components are registered.

   > **Note:** *Phoenix* does not work, if the components have not been registered.

8. To end the installation, click **Finish**.



Phoenix Service Software Setup

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Phoenix Service Software A. Click Finish to exit the wizard.

☑ Add Phoenix icon to Desktop.

Figure 4 InstallShield Wizard Complete

Next actions

After the installation, *Phoenix* can be used after:

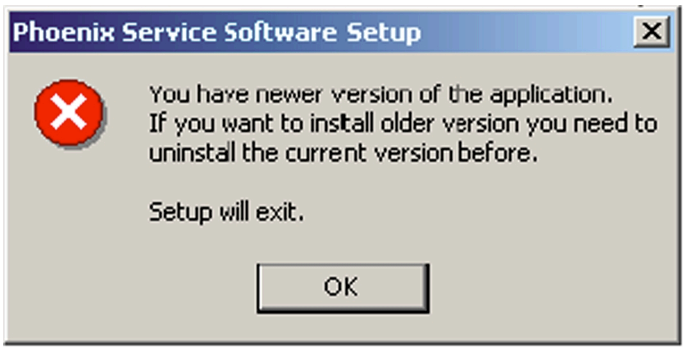
- installing phone model specific data package for *Phoenix*
- configuring users and connections

FPS-10 flash prommer can be used after updating their flash update package files.

Updating *Phoenix* installation

Context

- If you already have the *Phoenix* service software installed on your computer, you need to update the software when new versions are released.
- To update *Phoenix*, you need to follow the same steps as when installing it for the first time.
- When you are updating, for example, from version **a14_2004_16_4_47** to **a15_2004_24_7_55**, the update will take place automatically without uninstallation.
- Always use the latest available versions of both *Phoenix* and the phone-specific data package. Instructions can be found in the phone model specific Technical Bulletins and phone data package *readme.txt* files (shown during installation).
- If you try to update *Phoenix* with the same version you already have (for example, **a15_2004_24_7_55** to **a15_2004_24_7_55**), you are asked if you want to uninstall the existing version. In this case you can choose between a total uninstallation or a repair installation in a similar way when choosing to uninstall the application from the *Windows* Control Panel.
- If you try to install an older version (for example, downgrade from **a15_2004_24_7_55** to **a14_2004_16_4_47**), installation will be interrupted.



You have newer version of the application.
If you want to install older version you need to uninstall the current version before.

Setup will exit.

Figure 5 Installation interrupted

- Always follow the instructions on the screen.

Steps

1. Download the installation package to your computer hard disk.
2. Close all other programs.
3. Run the application file (for example, *phoenix_service_sw_2004_39_x_xx.exe*).

Results

A new *Phoenix* version is installed and driver versions are checked and updated.

Uninstalling *Phoenix*

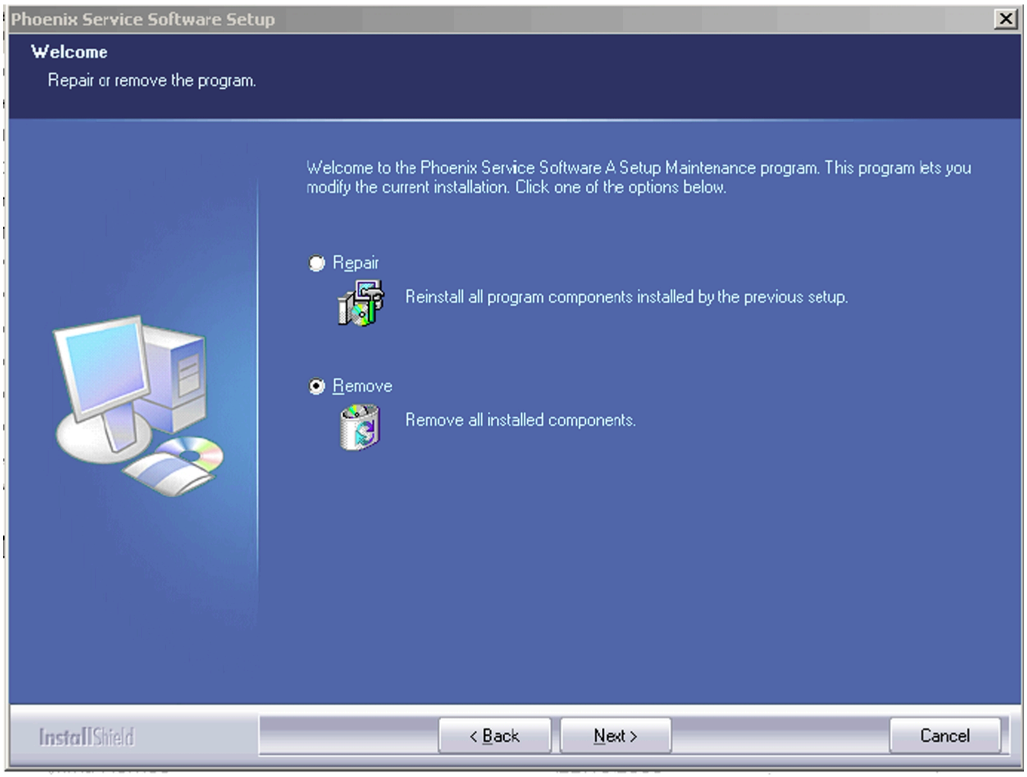
Context

You can uninstall *Phoenix* service software manually from the *Windows* Control Panel.

Steps

1. Open the **Windows Control Panel**, and choose **Add/Remove Programs**.

2. To uninstall *Phoenix*, choose **Phoenix Service Software**→**Change/Remove**→**Remove** .



Phoenix Service Software Setup

Welcome

Repair or remove the program.

Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.

○ Repair

Reinstall all program components installed by the previous setup.

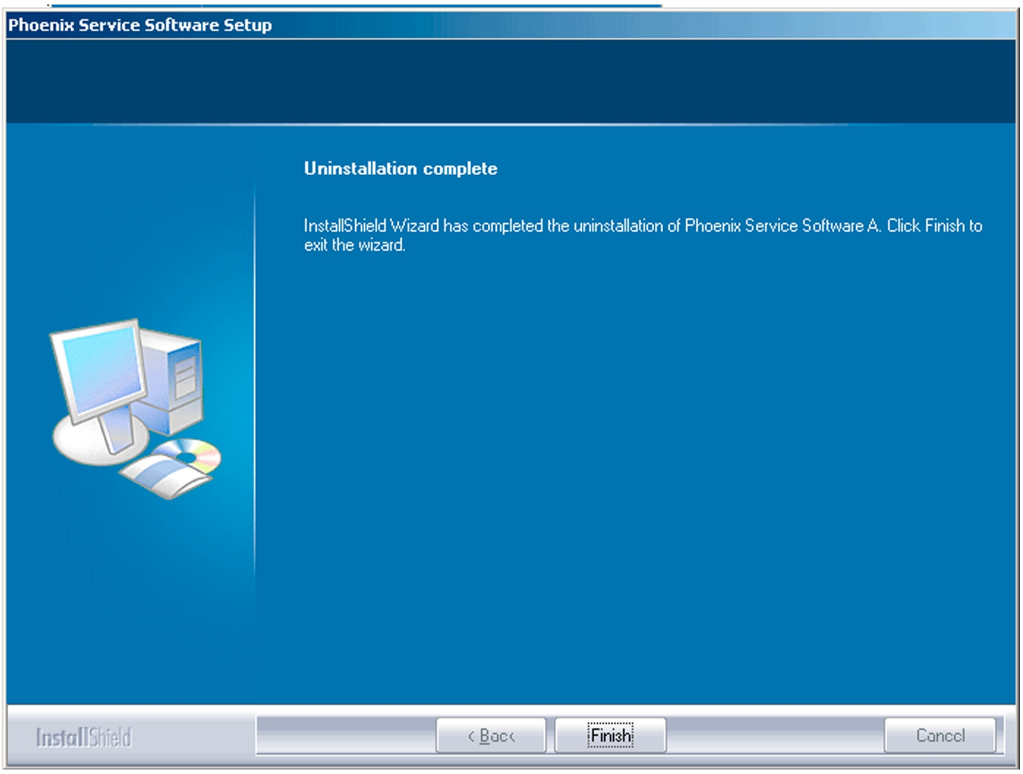
● Remove

Remove all installed components.

Figure 6 Remove program

The progress of the uninstallation is shown.

3. If the operating system does not require rebooting, click **Finish** to complete.



Phoenix Service Software Setup

Uninstallation complete

InstallShield Wizard has completed the uninstallation of Phoenix Service Software A. Click Finish to exit the wizard.

Figure 7 Finish uninstallation

If the operating system requires rebooting, InstallShield Wizard will notify you. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

Repairing *Phoenix* installation

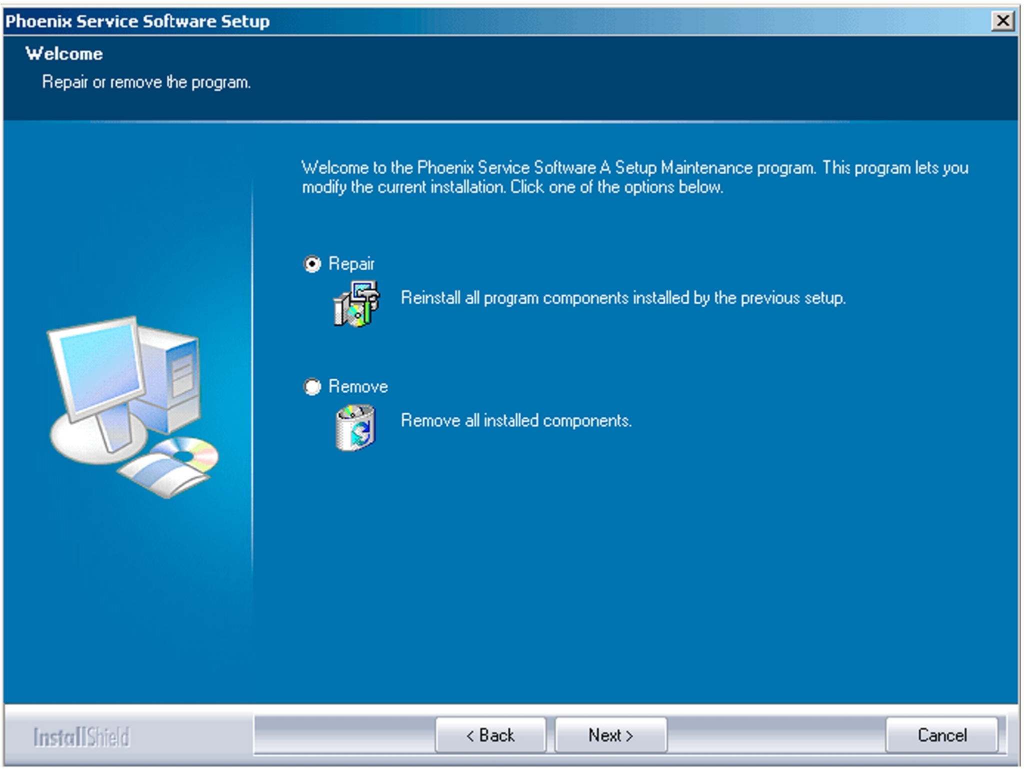
Context

If you experience any problems with the service software or suspect that files have been lost, use the repair function before completely reinstalling *Phoenix*.

> **Note:** The original installation package (for example, *phoenix_service_sw_a15_2004_24_7_55.exe*) must be found on your PC when you run the repair setup.

Steps

1. Open **Windows Control Panel→Add/Remove Programs** .
2. Choose **Phoenix Service Software→Change/Remove** .
3. In the following view, select **Repair**.



Phoenix Service Software Setup

Welcome

Repair or remove the program.

Welcome to the Phoenix Service Software A Setup Maintenance program. This program lets you modify the current installation. Click one of the options below.

● Repair
Reinstall all program components installed by the previous setup.

○ Remove
Remove all installed components.

Figure 8 Repair program

Phoenix reinstalls components and registers them.

The procedure is the same as when updating *Phoenix*.

4. To complete the repair, click **Finish**.

Phone data package overview

Each product has its own data package (DP). The product data package contains all product-specific data files to make the Phoenix service software and tools usable with a certain phone model.

The phone data package contains the following:

- Product software binary files

- Files for type label printing
- Validation file for the fault log repair data reporting system
- All product-specific configuration files for Phoenix software components

Data files are stored in **C:\Program Files\Nokia\Phoenix** (default).

Installing phone data package

Prerequisites

- A phone-specific data package contains all data required for the *Phoenix* service software and service tools to be used with a certain phone model.
- Check that a dongle is attached to the parallel port of your computer.
- Install *Phoenix* service software.
- Download the installation package (for example, *XX-XX_dp_EA_v_1_0.exe*) to your computer (for example, in C:\TEMP).
- Close all other programs.

(XX-XX = type designator of the product)

If you already have *Phoenix* installed on your computer, you will need to update it when a new version is released.

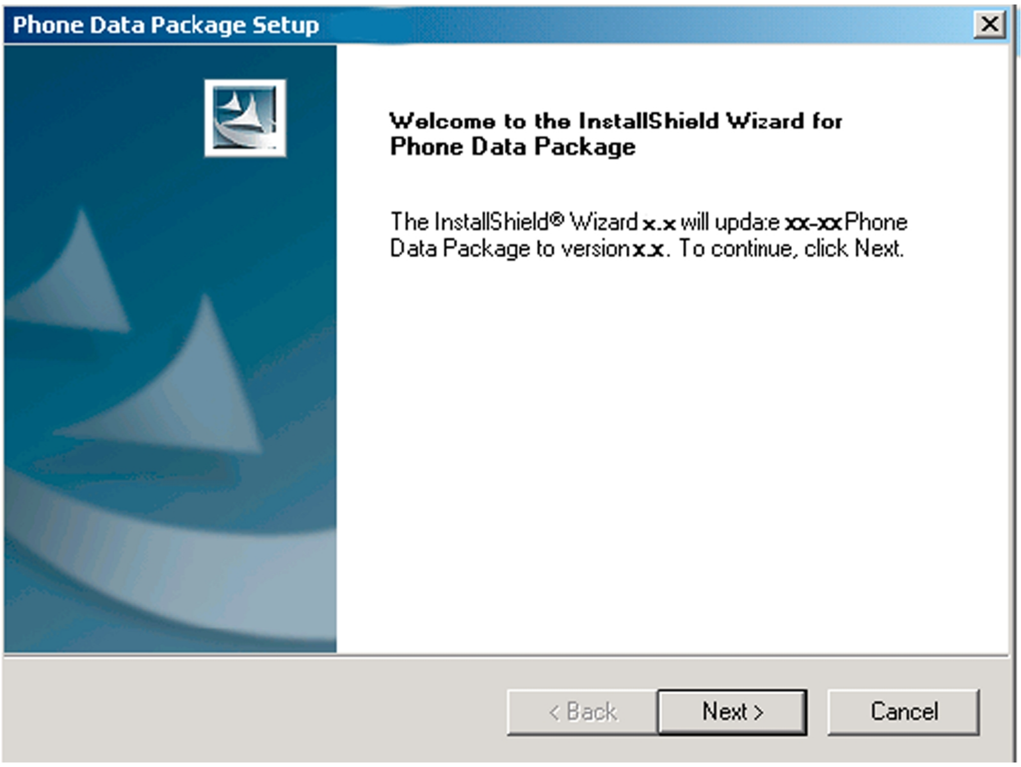
> **Note:** Often *Phoenix* and the phone-specific data package come in pairs, meaning that a certain version of *Phoenix* can only be used with a certain version of a data package. Always use the latest available versions of both. Instructions can be found in phone-specific Technical Bulletins and *readme.txt* files of data packages.

Steps

1. To start the installation, run the application file (for example, *XX-XX_dp_EA_ v_1_0.exe*),

   Wait for the installation files to be extracted.

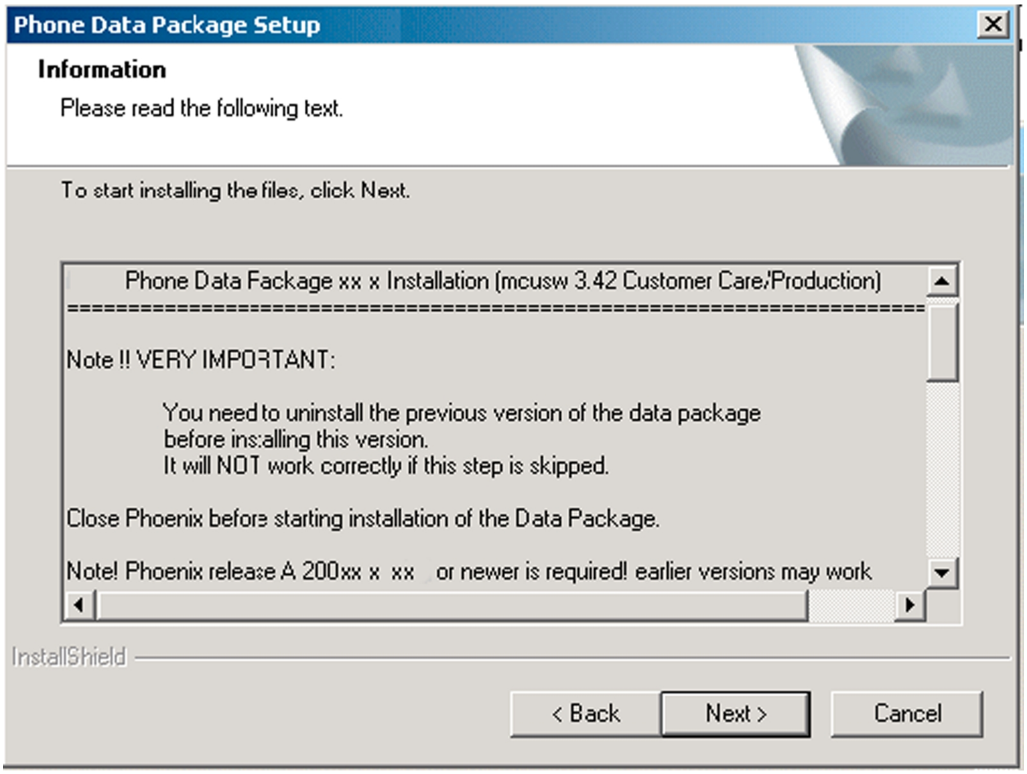
2. Click **Next**.


Phone Data Package Setup
< Back
Next >
Cancel

Welcome to the InstallShield Wizard for Phone Data Package

The InstallShield® Wizard x.x will update xx-xx Phone Data Package to version x.x. To continue, click Next.

3. In the following view you can see the contents of the data package. Read the text carefully. There is information about the *Phoenix* version required with this data package.


Phone Data Package Setup
Information
Please read the following text.
InstallShield
< Back
Next >
Cancel

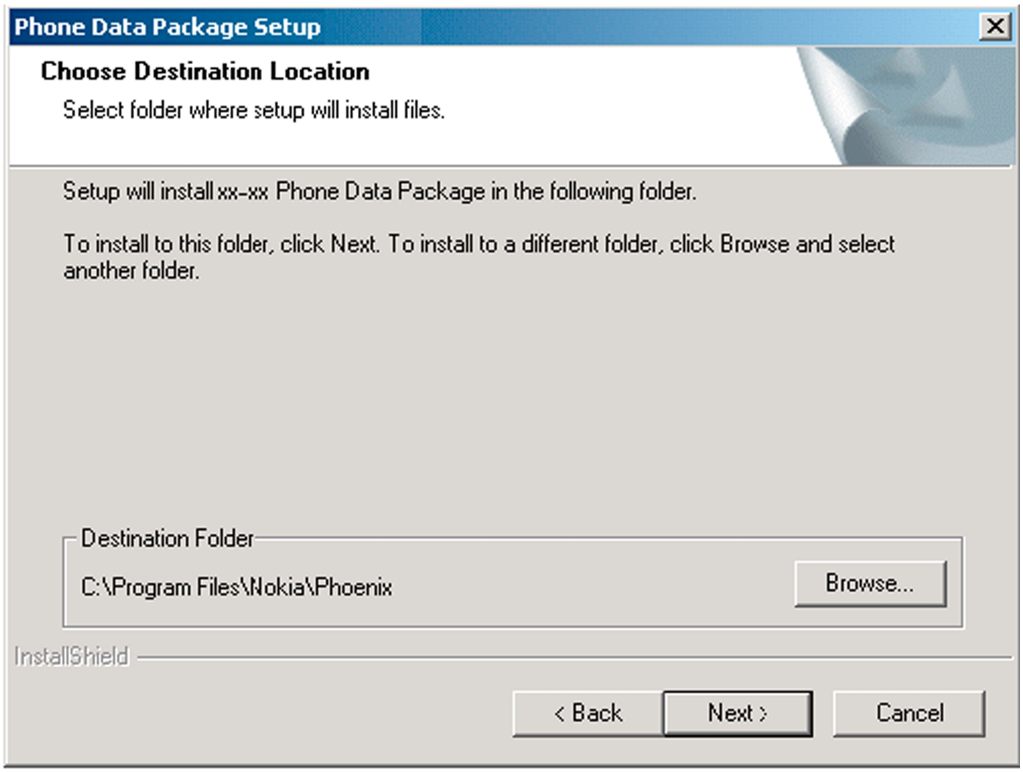
To start installing the files, click Next.

```
      Phone Data Package xx x Installation (mcusw 3.42 Customer Care/Production)
=========================================================================

Note !! VERY IMPORTANT:

          You need to uninstall the previous version of the data package
          before installing this version.
          It will NOT work correctly if this step is skipped.

Close Phoenix before starting installation of the Data Package.

Note! Phoenix release A 200xx x  xx   or newer is required! earlier versions may work
```

Figure 9 Data package setup information

4. To continue, click **Next**.

5. Choose the destination folder, and click **Next** to continue.



Phone Data Package Setup

Choose Destination Location

Select folder where setup will install files.

Setup will install xx-xx Phone Data Package in the following folder.

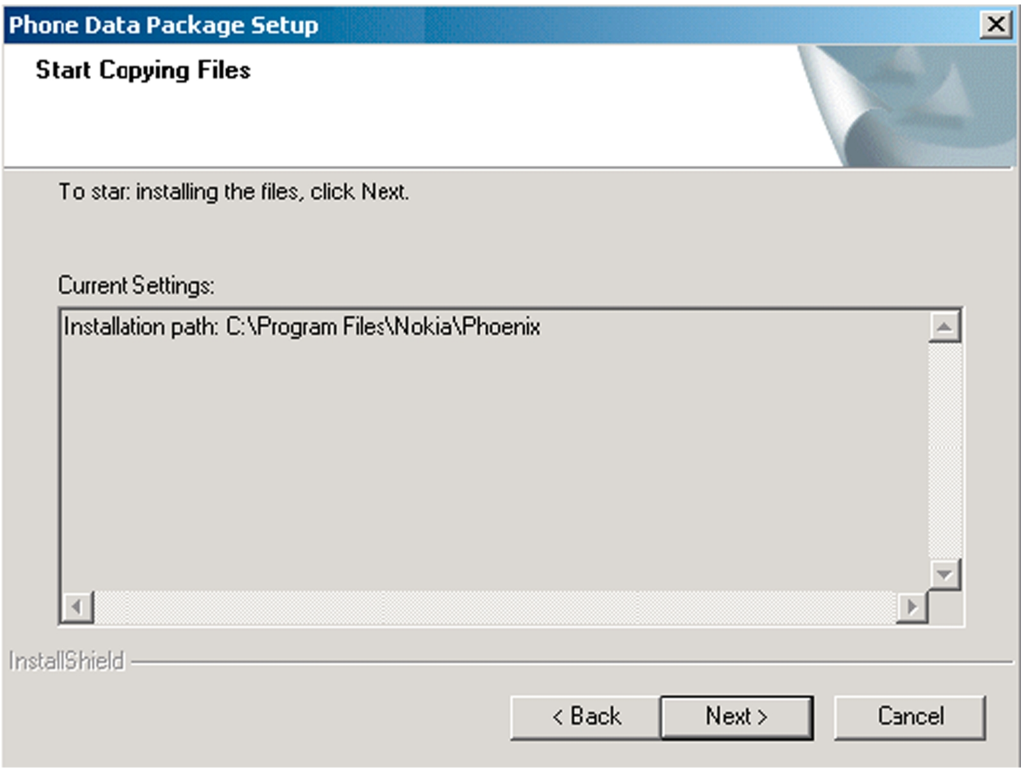
To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder: C:\Program Files\Nokia\Phoenix

Figure 10 Data package destination folder

The InstallShield Wizard checks where *Phoenix* is installed, and the directory is shown.

6. To start copying the files, click **Next**.



Phone Data Package Setup

Start Copying Files

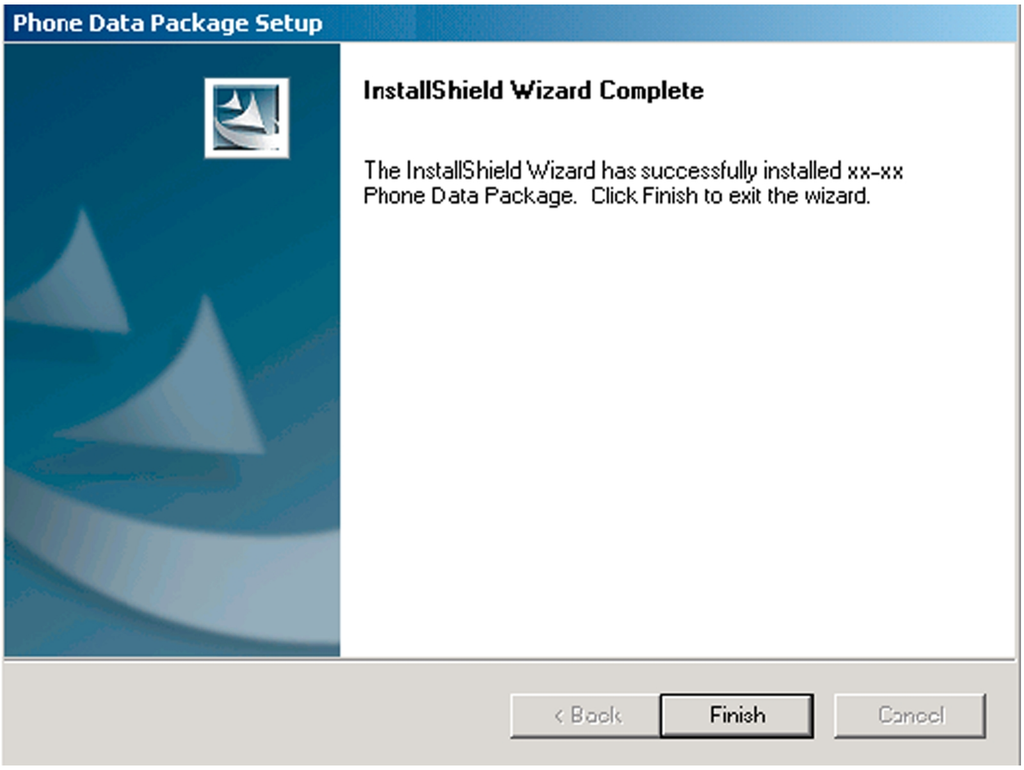
To start installing the files, click Next.

Current Settings:

Installation path: C:\Program Files\Nokia\Phoenix

Phone model specific files are installed. Please wait.

7. To complete the installation, click **Finish**.



InstallShield Wizard Complete

The InstallShield Wizard has successfully installed xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 11 InstallShield Wizard Complete

Next actions

Phoenix can be used for flashing phones and printing type labels after:

- Configuring users
- Managing connections

FPS-10 can be used after updating their flash update package files.

Uninstalling phone data package

Context

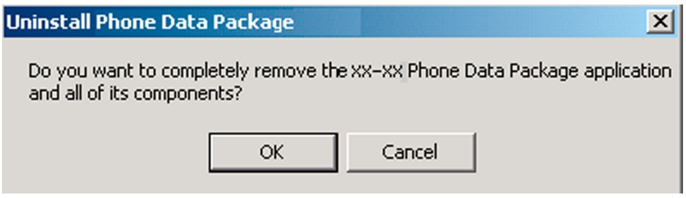
There is no need to uninstall an older version of a data package, unless instructions to do so are given in the *readme.txt* file of the data package and bulletins related to the release.

Please read all related documents carefully.

Steps

1. Locate the data package installation file (e.g. *XX-XX_dp_EA_v_1_0.exe*) from your computer.
2. To start the uninstallation procedure, double-click the data package installation file.

3. To uninstall the data package, click **OK** or to interrupt the uninstallation, click **Cancel**.

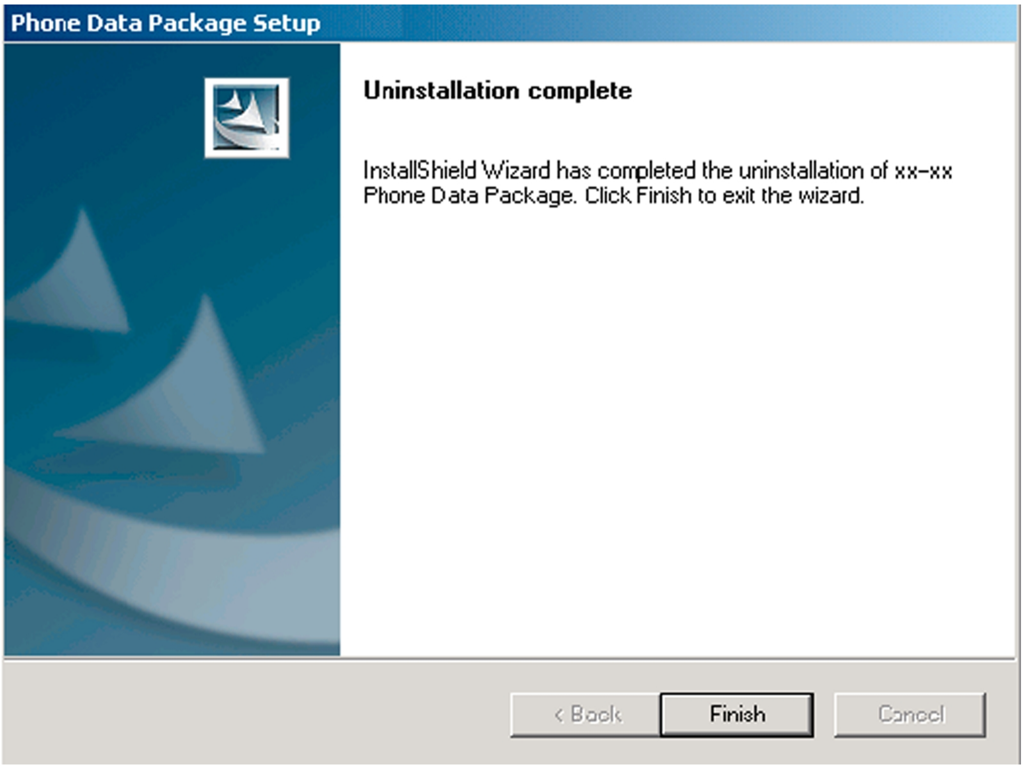


Uninstall Phone Data Package

Do you want to completely remove the xx-xx Phone Data Package application and all of its components?

Figure 12 Uninstalling phone data package

4. When the data package is uninstalled, click **Finish**.



Phone Data Package Setup

Uninstallation complete

InstallShield Wizard has completed the uninstallation of xx-xx Phone Data Package. Click Finish to exit the wizard.

Figure 13 Finishing data package uninstallation

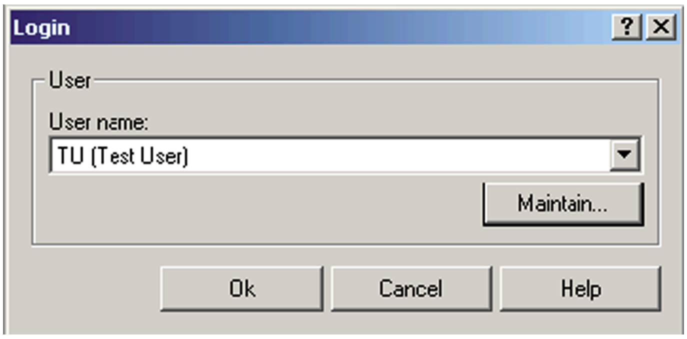
Alternative steps

- You can also uninstall the data package manually from **Control Panel→Add/Remove Programs→xx-xx* Phone Data Package** . (*= type designator of the phone).

Configuring users in *Phoenix*

Steps

1. Start *Phoenix* service software, and log in.



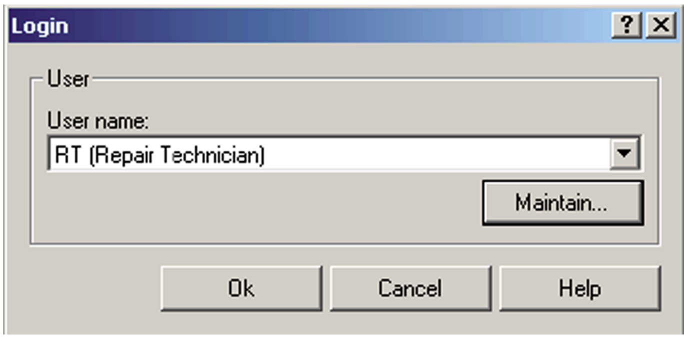
User name: TU (Test User)

Figure 14 Phoenix login

If the user ID is already configured, select s/he from the *User name* drop-down list, and click **OK**.

2. To add a new user, or to edit existing ones, click **Maintain**.
3. To add a new user, click **New**.
4. Type in the name and initials of the user, and click **OK**.

   The user is added to the user name list.
5. Select the desired user from the *User name* drop-down list, and click **OK**.



User name: RT (Repair Technician)

Figure 15 New user configured

Managing connections in *Phoenix*

Context

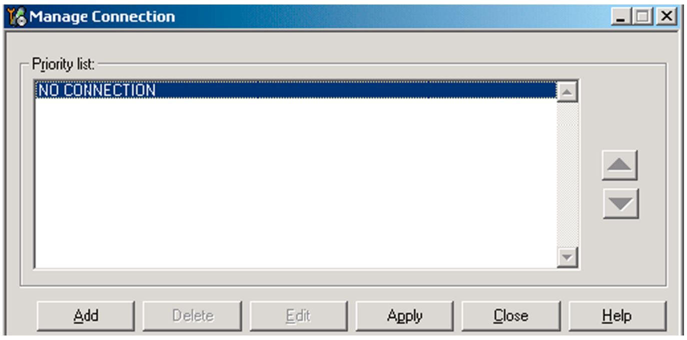
With the **Manage Connections** feature you can edit and delete existing connections or create new ones.

> **Note:** After choosing the desired connection, and connecting the phone to a PC for the first time, allow the PC to install the USB device drivers first. Please note that this may take some time to complete.
>
> If there are problems after the driver installation, check that the USB connection is active from the **Windows Control Panel**. If the problem persists, contact the local PC support.

Steps

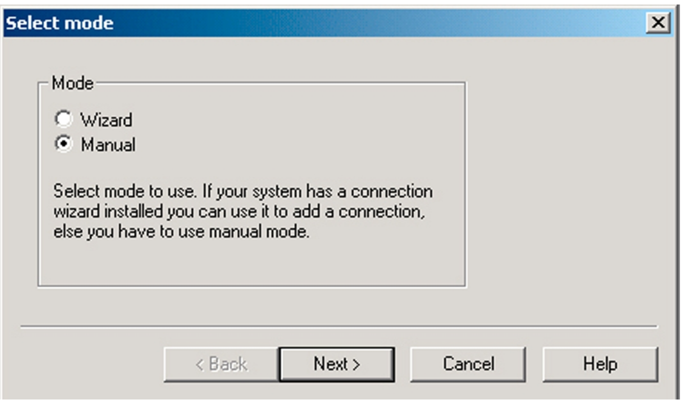
1. Start *Phoenix*, and log in.
2. Choose **File→Manage Connections...** .

3. To add a new connection, click **Add**.



4. Select **Manual** mode, and click **Next** to continue.

   If you want to create the connection using the Connection Wizard, connect the tools and a phone to your PC. The wizard will automatically try to configure the correct connection.



Select mode to use. If your system has a connection wizard installed you can use it to add a connection, else you have to use manual mode.

Figure 16 Select mode: Manual

i For an FPS-10 flash prommer with a **USB Connection**, choose the following connection settings:

- Media: **FPS-10 USB**
- DEVICE_INDEX: **0**
- SERIAL_NUM: See Serial No from the label attached to the bottom of FPS-10
- ACTIVE_MEDIA: **USB**

ii For an FPS-10 flash prommer with a **LAN connection**, choose the following connection settings:

- Media: **FPS-10 TCP/IP**
- NET_SERV_NAME: Click **Scan...**. Choose your own FPS-10 device based on the correct MAC address. See Serial No from the label attached to the bottom of your FPS-10.
- PORT_NUM: Use the default value, and click **Next**.
- PROTOCOL_FAMILY: Use the default value, and click **Next**.
- SOCKET TYPE: Use the default value, and click **Next**.
- TX_BUFFER_SIZE: Use the default value, and click **Next**.
- RX_BUFFER_SIZE: Use the default value, and click **Next**.

iii For an FPS-8 flash prommer, choose the following connection settings:

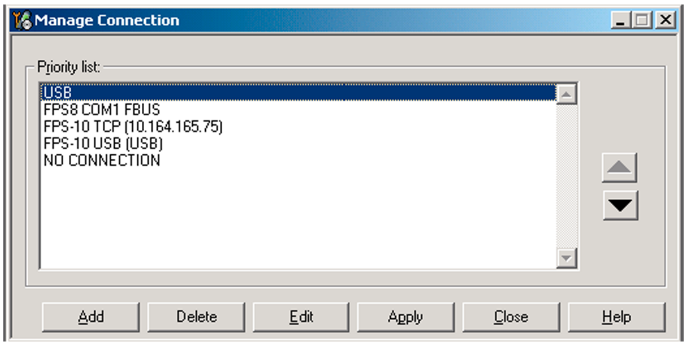
- Media: FPS-8
- PORT_NUM: COM Port where FPS-8 is connected
- COMBOX_DEF_MEDIA: **FBUS**

iv For a plain **USB connection**, choose the following connection settings:

Note: First connect the DKU-2 USB cable between the PC USB port and phone.

- Media: USB

5. To complete the configuration, click **Finish**.
6. Click the connection you want to activate. Use the up/down arrows located on the right hand side to move it on top of the list, then click **Apply**.



USB
FPS8 COM1 FBUS
FPS-10 TCP (10.164.165.75)
FPS-10 USB (USB)
NO CONNECTION

Figure 17 Connections list

The connection is activated, and it can be used after closing the *Manage Connection* window.

The connection information is shown at the right hand bottom corner of the screen.

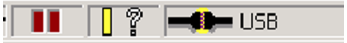
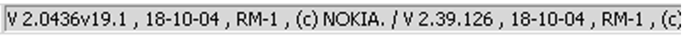


Figure 18 Connection information

7. To use the connection, connect the phone to your PC with correct service tools. Make sure the phone is switched on, and then choose **File→Scan Product** .

Results

The product support module information appears in the status bar:



V 2.0436v19.1 , 18-10-04 , RM-1 , (c) NOKIA. / V 2.39.126 , 18-10-04 , RM-1 , (c)

Figure 19 Product support module information (example from RM-1)

■ Installing flash support files for FPS-10

Prerequisites

Note: You need to install flash support files for FPS-10 only, if you don’t have the latest Phoenix available or the flash support files have changed after the latest Phoenix release.

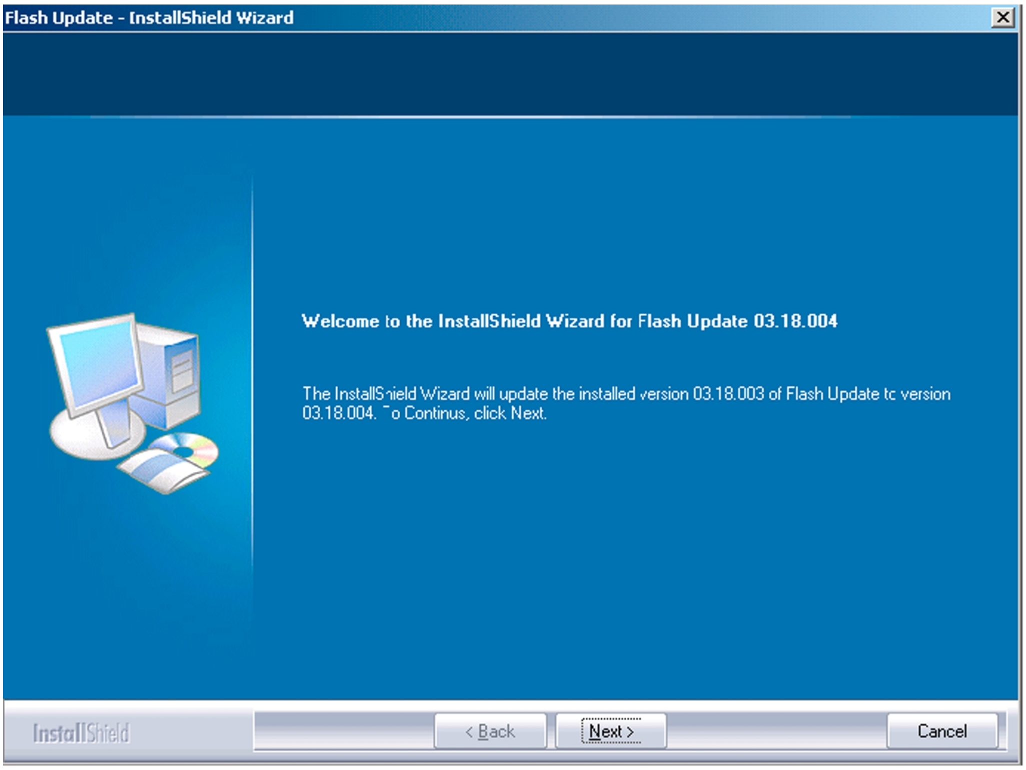
- Flash support files are installed automatically, when you install Phoenix. Use Phoenix packages later than June 2006.
- Normally it is enough to install Phoenix and the phone-specific data package because the Phoenix installation always includes the latest flash update package files for FPS-10.
- A separate installation package for flash support files is available, and the files can be updated according to this instruction, if updates appear between new Phoenix / data package releases

Context

If you are not using a separate installation package, you can skip this section and continue with updating FPS-10 flash prommer software after installing a new phone data package.

Steps

1. To begin installation, double- click *flash_update_x_yy.exe* .



Flash Update - InstallShield Wizard

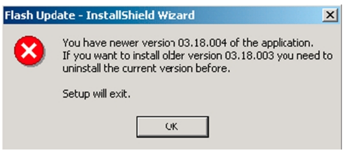
Welcome to the InstallShield Wizard for Flash Update 03.18.004

The InstallShield Wizard will update the installed version 03.18.003 of Flash Update to version 03.18.004. To Continue, click Next.

Figure 20 Flash update welcome dialog

   If the same version of Flash Update package already exists, and you want to reinstall it, the previous package is first uninstalled. Restart installation again after that.

2. If you try to downgrade the existing version to older ones, the setup will be aborted. If you really want to downgrade, uninstall newer files manually from **Control Panel** and then rerun the installation again.



Flash Update - InstallShield Wizard

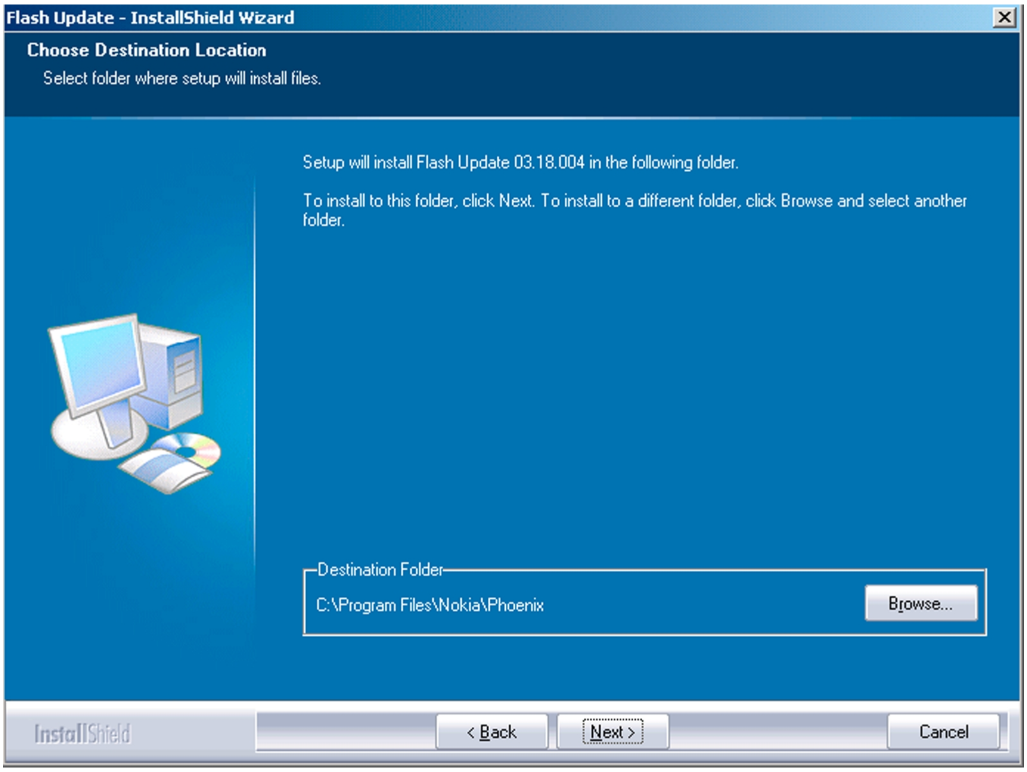
You have newer version 03.18.004 of the application.
If you want to install older version 03.18.003 you need to uninstall the current version before.

Setup will exit.

Figure 21 Flash installation interrupted

   If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

3. It is highly recommended to install the files to the default destination folder *C:|Program Files|Nokia |Phoenix*. Click **Next** to continue.



Flash Update - InstallShield Wizard
Choose Destination Location
Select folder where setup will install files.

Setup will install Flash Update 03.18.004 in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder

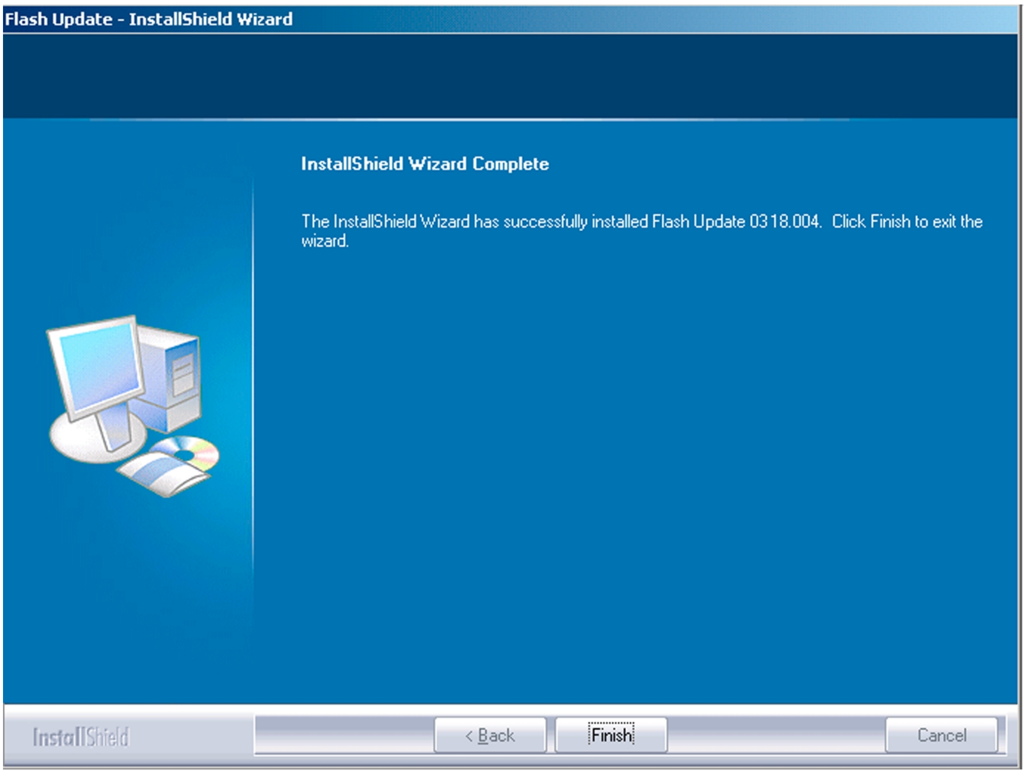
C:\Program Files\Nokia\Phoenix

Browse...
InstallShield
< Back
Next >
Cancel

Figure 22 Flash destination folder

When installing the flash update files for the first time you may choose another location by selecting **Browse**. However, this is not recommended.

4. To complete the installation procedure, click **Finish** .



Flash Update - InstallShield Wizard

InstallShield Wizard Complete

The InstallShield Wizard has successfully installed Flash Update 0318.004. Click Finish to exit the wizard.

Figure 23 Finish flash update

Next actions

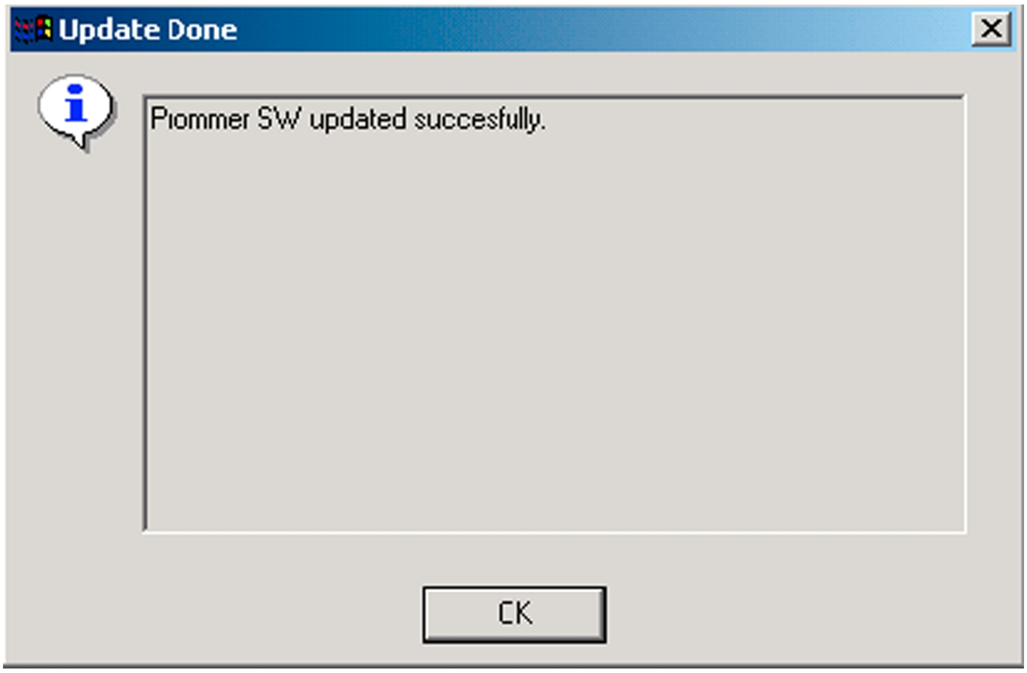
FPS-10 flash prommers must be updated using Phoenix!

Updating FPS-10 flash prommer software

Steps

1. Start *Phoenix Service Software* and log in, manage connection correctly for your flash prommer.
2. Choose **Flashing→Prommer maintenance** .
3. When the new flash update package is installed to the computer you will be asked to update the files to your Prommer. To update the files, click **Yes**. Click **OK** if the computer informs you about an unsafe removal of the device.
4. Alternatively you can update the FPS-10 flash prommer software by clicking the **Update** button.

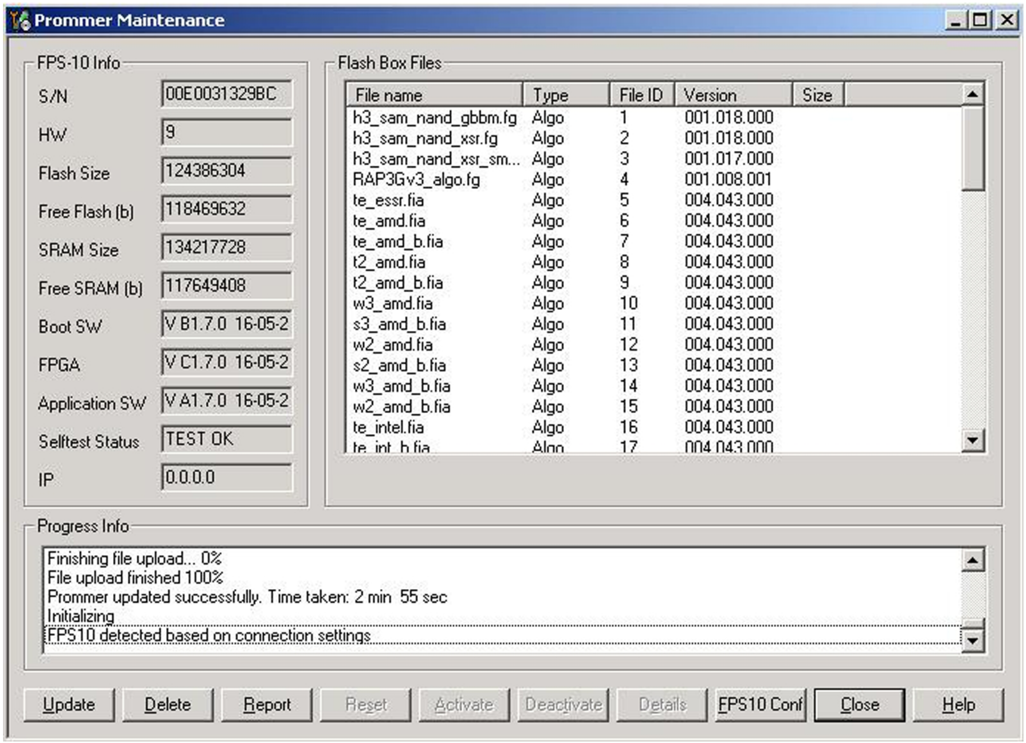
5. Wait until you are notified that update has been successful; the procedure will take a couple of minutes. Click **OK** to close the *Update Done* window.



Prommer SW updated succesfully.

Figure 24 Prommer SW update finished

6. If you are using the FPS-10 flash prommer, check that it is detected from the progress info. Check also the status leds in the FPS-10. The MODE2 led (green), VBAT and POWER leds (red) should be lit. If you are using LAN connection, the LAN led (yellow) should be blinking.
7. Check that your FPS-10 flash prommer has enough memory. Flashing the SU-18 with FPS-10 needs at least 128 MB of SRAM memory in the prommer.



S/N 00E0031329BC
HW 9
Flash Size 124386304
Free Flash (b) 118469632
SRAM Size 134217728
Free SRAM (b) 117649408
Boot SW V B1.7.0 16-05-2
FPGA V C1.7.0 16-05-2
Application SW V A1.7.0 16-05-2
Selftest Status TEST OK
IP 0.0.0.0

File name	Type	File ID	Version	Size
h3_sam_nand_gbbm.fg	Algo	1	001.018.000	
h3_sam_nand_xsr.fg	Algo	2	001.018.000	
h3_sam_nand_xsr_sm...	Algo	3	001.017.000	
RAP3Gv3_algo.fg	Algo	4	001.008.001	
te_essr.fia	Algo	5	004.043.000	
te_amd.fia	Algo	6	004.043.000	
te_amd_b.fia	Algo	7	004.043.000	
t2_amd.fia	Algo	8	004.043.000	
t2_amd_b.fia	Algo	9	004.043.000	
w3_amd.fia	Algo	10	004.043.000	
s3_amd_b.fia	Algo	11	004.043.000	
w2_amd.fia	Algo	12	004.043.000	
s2_amd_b.fia	Algo	13	004.043.000	
w3_amd_b.fia	Algo	14	004.043.000	
w2_amd_b.fia	Algo	15	004.043.000	
te_intel.fia	Algo	16	004.043.000	
te_int_b.fia	Algo	17	004.043.000	

```
Finishing file upload... 0%
File upload finished 100%
Prommer updated successfully. Time taken: 2 min  55 sec
Initializing
FPS10 detected based on connection settings
```

Figure 25 Prommer maintenance window

Alternative steps

- You can update FPS-10 SW by clicking the **Update** button and selecting the appropriate fpsxupd.ini file in *C:|Program Files|Nokia|Phoenix|Flash*.

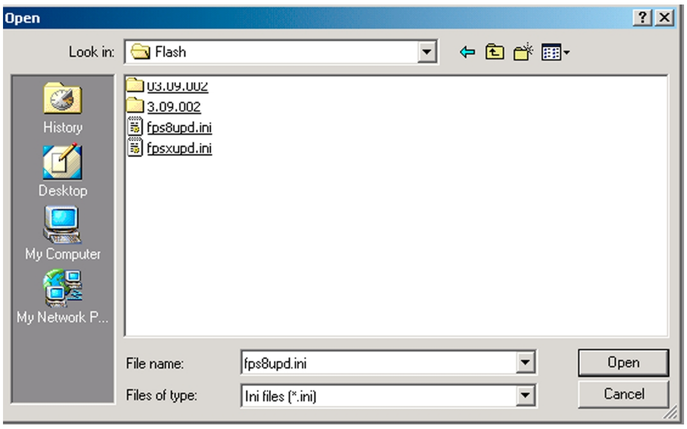

Open
Look in:
Flash
03.09.002
3.09.002
fps8upd.ini
fpsxupd.ini
History
Desktop
My Computer
My Network P...
File name:
fps8upd.ini
Files of type:
Ini files (*.ini)
Open
Cancel

Figure 26 Flash directory window

- All files can be loaded separately to the prommer used. To do this, click the right mouse button in the *Flash box files* window and select the file type to be loaded.

  More information can be found in Phoenix **Help**.

4 — Service Tools and Service Concepts

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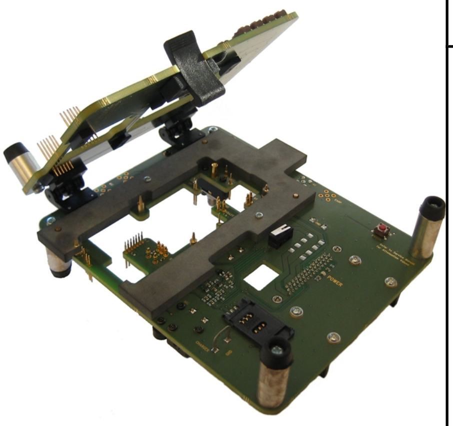
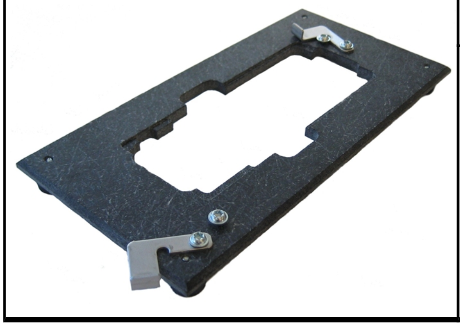
Service tools

Product specific tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-217; RM-222, refer to various concepts.

<table>
<tr><td rowspan="2"> </td><td>FS-47</td><td>Flash adapter</td><td></td></tr>
<tr><td colspan="3">For flashing (also dead phones) with SS-64. RF testing and tuning, and EM calibration on ATO level with SS-62 (mechanical locking concept), CU-4 supported.</td></tr>
<tr><td rowspan="2"></td><td>MJ-122</td><td>Module jig</td><td></td></tr>
<tr><td colspan="3">MJ-122 is meant for troubleshooting, testing, tuning and flashing on the engine level (CU-4 supported).
The jig includes an RF interface for GSM and Bluetooth.
The following table shows the attenuation values for galvanic RF connetion:
•
<table>
<tr><th>Band</th><th>Tuning channel</th><th>Attenuation RX</th><th>Attenuation TX</th></tr>
<tr><td>GSM850</td><td>190</td><td>0,1</td><td>0,1</td></tr>
<tr><td>GSM900</td><td>37</td><td>0,1</td><td>0,1</td></tr>
<tr><td>GSM1800</td><td>700</td><td>0,15</td><td>0,15</td></tr>
<tr><td>GSM1900</td><td>661</td><td>0,15</td><td>0,15</td></tr>
</table></td></tr>
<tr><td rowspan="2"></td><td>RJ-148</td><td>Soldering jig</td><td></td></tr>
<tr><td colspan="3">RJ-148 is a soldering jig used for soldering and as a rework jig for the engine module.</td></tr>
</table>

SA-123	RF coupler	

SA-123 is an RF coupler for GSM RF testing. It is used together with the product-specific flash adapter.

The following table shows attenuations from the antenna pads of the mobile terminal to the SMA connectors of SA-123:

- **Nokia 6300 (RM-217)**

Band	Channel	Tx-att. (dB)	Rx-att. (dB)
EGSM 900	975	5,6	6
	38	5,2	7
	124	5,2	7
GSM 1800	512	7,3	10
	698	8,2	10
	885	8,1	10
GSM 1900	512	8,6	9
	661	8,7	7
	810	9,1	7

Tx-attenuation tolerance is +/-0.5 dB

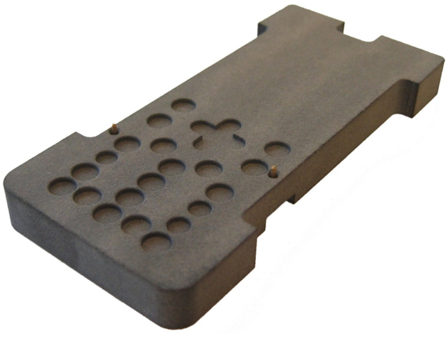
Rx-attenuation tolerance is +/-1.0dB

- **Nokia 6300b (RM-222)**

Band	Channel	Tx-att. (dB)	Rx-att. (dB)
GSM 850	128	8,1	9
	190	7,4	9
	251	7,7	10
GSM 1800	512	8,6	7
	698	8,7	8
	885	7,5	6
GSM 1900	512	6,7	8
	661	6,1	8
	810	6,8	8

Tx-attenuation tolerance is +/-0.5 dB

Rx-attenuation tolerance is +/-1.0dB

	SS-101	Domesheet alignment jig	
	The purpose of this tool is to support the placement of a domesheet to the PWB.		

General tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-217; RM-222, refer to various concepts.

CU-4	Control unit	

CU-4 is a general service tool used with a module jig and/or a flash adapter. It requires an external 12 V power supply.

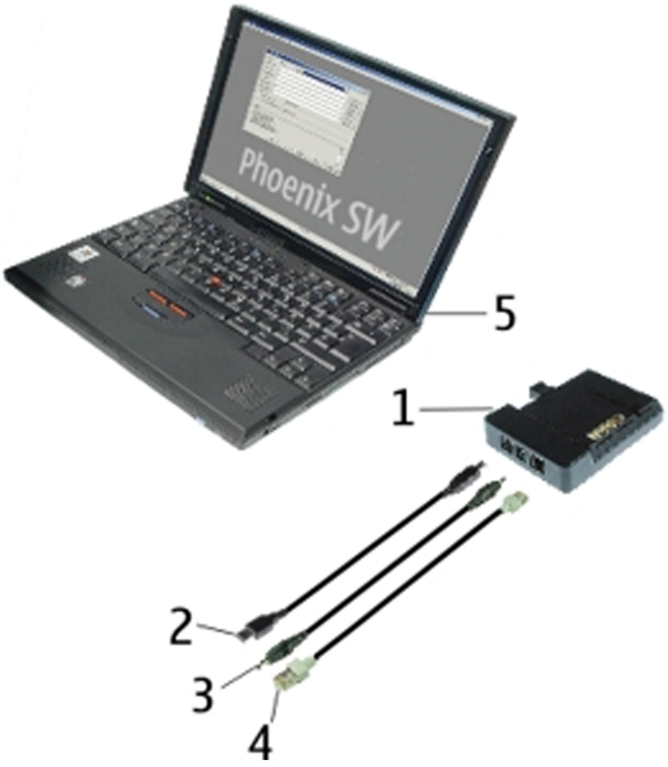
The unit has the following features:

- software controlled via USB
- EM calibration function
- Forwards FBUS/Flashbus traffic to/from terminal
- Forwards USB traffic to/from terminal
- software controlled BSI values
- regulated VBATT voltage
- 2 x USB2.0 connector (Hub)
- FBUS and USB connections supported

When using CU-4, note the special order of connecting cables and other service equipment:

Instructions

1. Connect a service tool (jig, flash adapter) to CU-4.
2. Connect CU-4 to your PC with a USB cable.
3. Connect supply voltage (12 V)
4. Connect an FBUS cable (if necessary).
5. Start Phoenix service software.

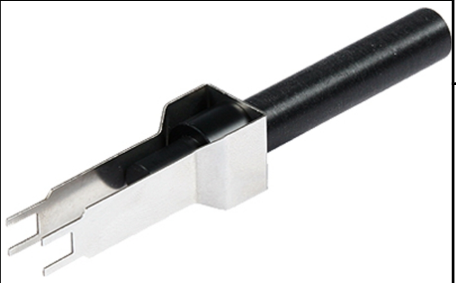
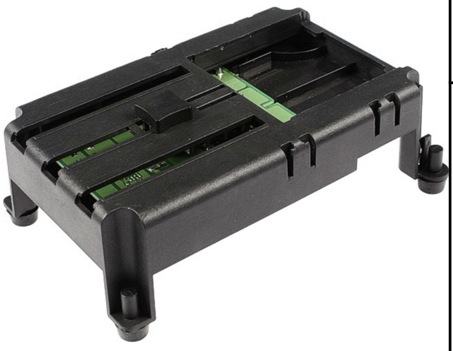
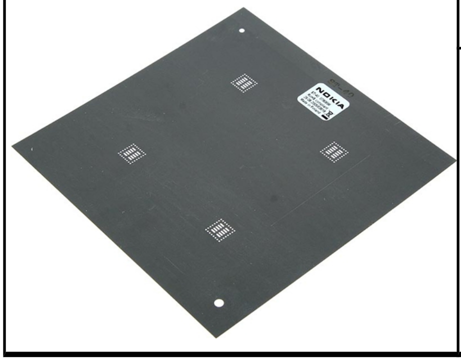


Note: Phoenix enables CU-4 regulators via USB when it is started.

Reconnecting the power supply requires a Phoenix restart.

	FLS-4S	Flash device	
	FLS-4S is a dongle and flash device incorporated into one package, developed specifically for POS use.		
	FLS-5	Flash device	
	FLS-5 is a dongle and flash device incorporated into one package, developed specifically for POS use.		
	FPS-10	Flash prommer	
	FPS-10 interfaces with: • PC • Control unit • Flash adapter • Smart card FPS-10 flash prommer features: • Flash functionality for BB5 and DCT-4 terminals • Smart Card reader for SX-2 or SX-4 • USB traffic forwarding • USB to FBUS/Flashbus conversion • LAN to FBUS/Flashbus and USB conversion • Vusb output switchable by PC command FPS-10 sales package includes: • FPS-10 prommer • Power Supply with 5 country specific cords • USB cable		

<table>
<tr><td rowspan="2"> </td><td>JBT-9</td><td>Bluetooth test and interface box (sales package)</td><td></td></tr>
<tr><td colspan="3">The JBT-9 test box is a generic service device used to perform Bluetooth bit error rate (BER) testing, and establishing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and an AXS-4 cable in case of cordless interface usage testing .
Sales package includes:
• JBT-9 test box
• Installation and warranty information</td></tr>
<tr><td rowspan="2"> </td><td>PK-1</td><td>Software protection key</td><td></td></tr>
<tr><td colspan="3">PK-1 is a hardware protection key with a USB interface. It has the same functionality as the PKD-1 series dongle.
PK-1 is meant for use with a PC that does not have a series interface.
To use this USB dongle for security service functions please register the dongle in the same way as the PKD-1 series dongle.</td></tr>
<tr><td rowspan="2"> </td><td>PKD-1</td><td>SW security device</td><td></td></tr>
<tr><td colspan="3">SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC.
Without the device, it is not possible to use the service software.
Printer or any such device can be connected to the PC through the device if needed.</td></tr>
<tr><td rowspan="2"> </td><td>RJ-93</td><td>Rework jig</td><td></td></tr>
<tr><td colspan="3">RJ-93 is used as a rework jig for the engine module.
This stencil takes the front end module (FEM) or power amplifier (PA) module for spreading the soldering paste to the component. Must be used together with the ST-40 stencil.</td></tr>
<tr><td rowspan="2"></td><td>SPS-1</td><td>Soldering Paste Spreader</td><td></td></tr>
<tr><td colspan="3"></td></tr>
</table>

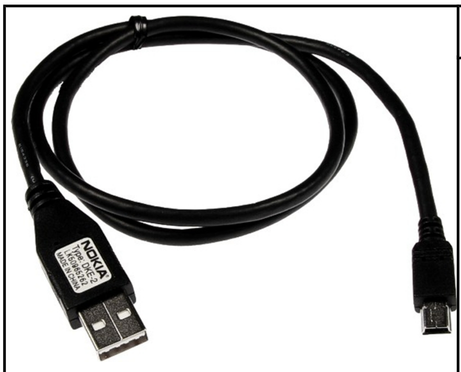
	SRT-6	Opening tool	SRT-6 is used to open phone covers and B-to-B connectors.
	SS-45	Front camera removal tool	The front camera removal tool SS-45 is used to remove/attach the front camera module from/to the socket.
	SS-46	Interface adapter	SS-46 acts as an interface adapter between the flash adapter and FPS-10.
	SS-62	Generic flash adapter base for BB5	• generic base for flash adapters and couplers • SS-62 equipped with a clip interlock system • provides standardised interface towards Control Unit • provides RF connection using galvanic connector or coupler • multiplexing between USB and FBUS media, controlled by VUSB
	ST-40	rework stencil	ST-40 is a rework stencil and used with RJ-93.

<table>
<tr><td rowspan="2"> </td><td>SX-4</td><td>Smart card</td><td></td></tr>
<tr><td colspan="3">SX-4 is a BB5 security device used to protect critical features in tuning and testing.
SX-4 is also needed together with FPS-10 when DCT-4 phones are flashed.</td></tr>
</table>

Cables

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-217; RM-222, refer to various concepts.

<table>
<tr><td rowspan="2"></td><td>CA-31D</td><td>USB cable</td><td></td></tr>
<tr><td colspan="3">The CA-31D USB cable is used to connect FPS-10 or FPS-11 to a PC. It is included in the FPS-10 and FPS-11 sales packages.</td></tr>
<tr><td rowspan="2"> </td><td>CA-35S</td><td>Power cable</td><td></td></tr>
<tr><td colspan="3">CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.</td></tr>
<tr><td rowspan="2"> </td><td>DAU-9S</td><td>MBUS cable</td><td></td></tr>
<tr><td colspan="3">The MBUS cable DAU-9S has a modular connector and is used, for example, between the PC's serial port and module jigs, flash adapters or docking station adapters.
Note: Docking station adapters valid for DCT4 products.</td></tr>
</table>

<table>
<tr><td rowspan="2"></td><td>DKE-2</td><td>Mini-USB cable</td><td></td></tr>
<tr><td colspan="3">USB to mini-USB connector cable.</td></tr>
<tr><td rowspan="2"> </td><td>PCS-1</td><td>Power cable</td><td></td></tr>
<tr><td colspan="3">The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled operating voltage.</td></tr>
<tr><td rowspan="2"> </td><td>XCS-4</td><td>Modular cable</td><td></td></tr>
<tr><td colspan="3">XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.</td></tr>
<tr><td rowspan="2"> </td><td>XRE-2</td><td>Bluetooth cable</td><td></td></tr>
<tr><td colspan="3">The bluetooth cable connects the bluetooth connector of the module jig to the bluetooth test box JBT-9.</td></tr>
</table>

<table>
<tr><td rowspan="2"> </td><td>XRS-6</td><td>RF cable</td><td></td></tr>
<tr><td colspan="3">The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment.
SMA to N-Connector approximately 610 mm.
Attenuation for:
• GSM850/900: 0.3+-0.1 dB
• GSM1800/1900: 0.5+-0.1 dB
• WLAN: 0.6+-0.1dB</td></tr>
</table>

Service concepts

POS (Point of Sale) flash concept

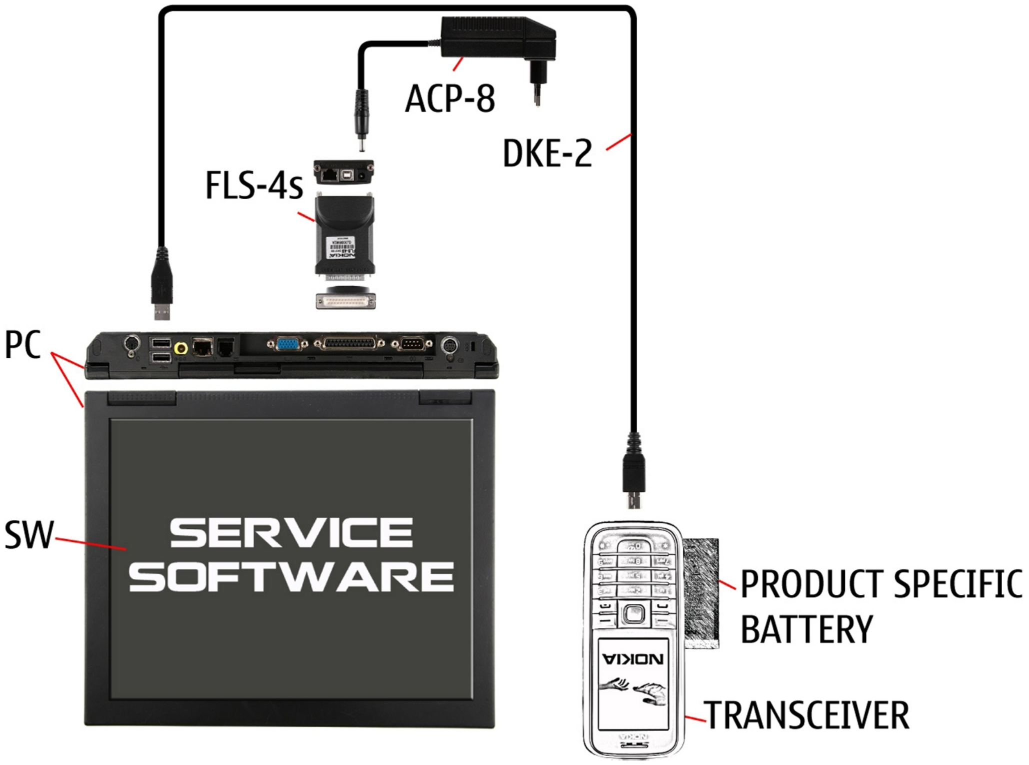

ACP-8
DKE-2
FLS-4s
PC
SW
SERVICE SOFTWARE
PRODUCT SPECIFIC BATTERY
TRANSCEIVER

Figure 27 POS flash concept

Type	Description
Product specific tools	
BL-4C	Battery
Other tools	
ACP-8	Power adapter
FLS-4S or FLS-5	POS flash dongle

Type	Description
	PC with Phoenix service software
Cables	
DKE-2	USB connectivity cable

Flash concept with FPS-10

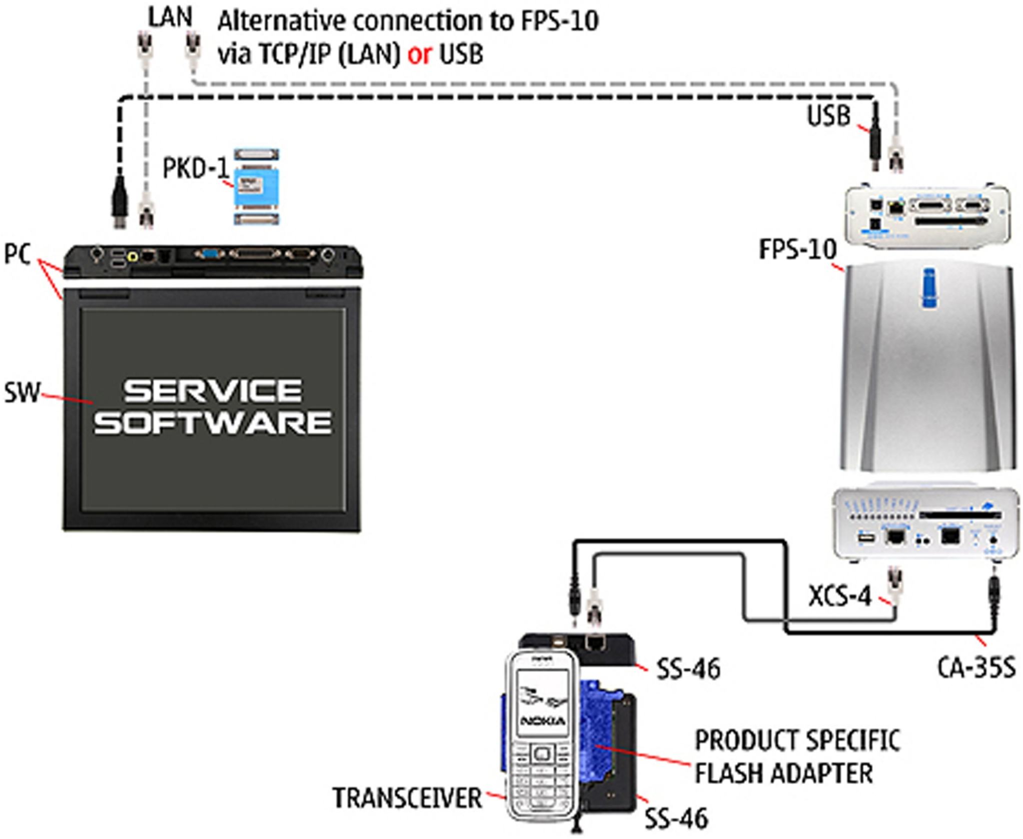

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
PKD-1
PC
SW
SERVICE SOFTWARE
FPS-10
XCS-4
SS-46
CA-35S
PRODUCT SPECIFIC
FLASH ADAPTER
TRANSCEIVER
SS-46

Figure 28 Basic flash concept with FPS-10

Type	Description
Product specific tools	
FS-47	Flash adapter
Other tools	
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-46	Interface adapter
	PC with Phoenix service software
Cables	
XCS-4	Modular cable
CA-35S	Power cable

Type	Description
	USB cable

CU-4 flash concept with FPS-10

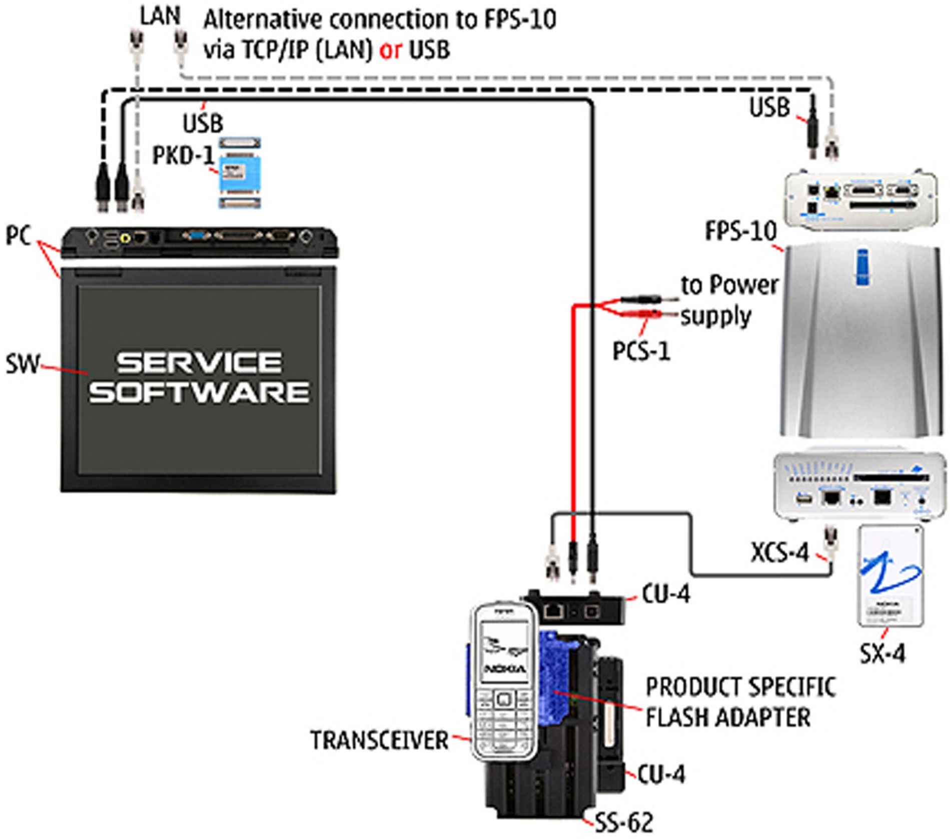

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
USB
PKD-1
USB
PC
SW
SERVICE SOFTWARE
FPS-10
to Power supply
PCS-1
XCS-4
CU-4
SX-4
PRODUCT SPECIFIC FLASH ADAPTER
TRANSCEIVER
CU-4
SS-62

Figure 29 CU-4 flash concept with FPS-10

Type	Description
Product specific tools	
FS-47	Flash adapter
Other tools	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
SX-4	Smart card
	PC with Phoenix service software
Cables	
PCS-1	Power cable
XCS-4	Modular cable
	Standard USB cable

Type	Description
	USB cable

Module jig service concept

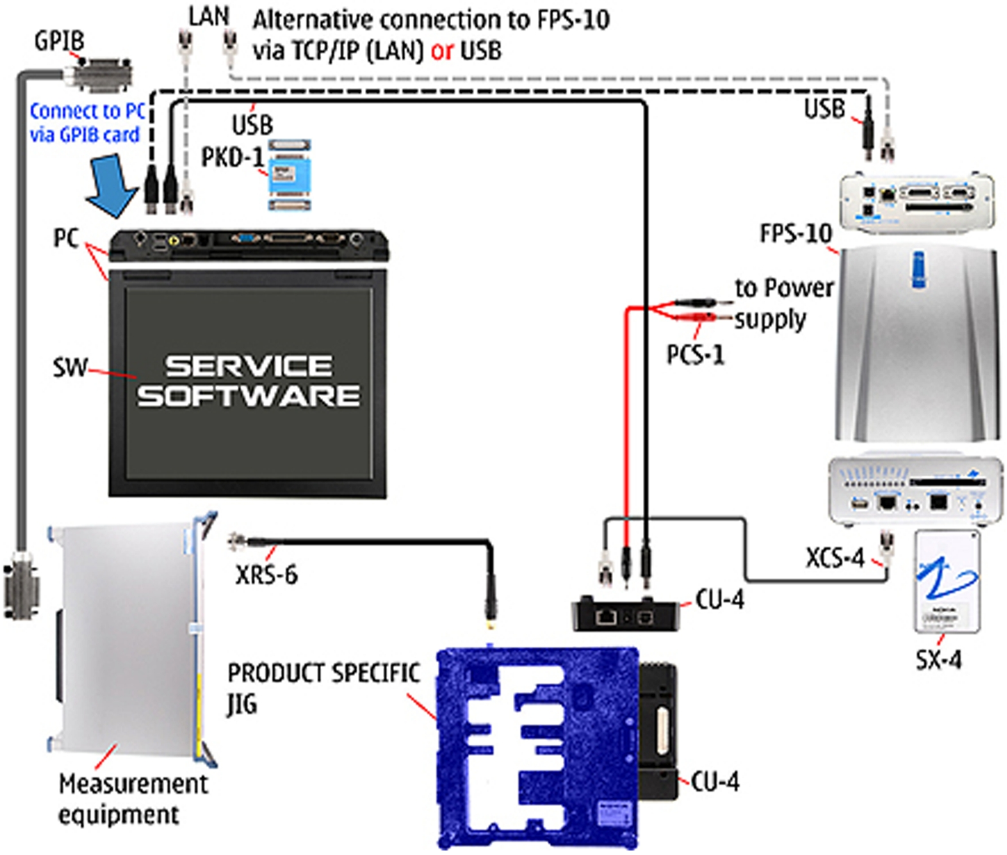

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
GPIB
Connect to PC
via GPIB card
USB
PKD-1
USB
PC
FPS-10
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
XRS-6
XCS-4
CU-4
SX-4
PRODUCT SPECIFIC
JIG
Measurement
equipment
CU-4

Figure 30 Module jig service concept

Type	Description
Phone specific tools	
MJ-122	Module jig
Other tools	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SX-4	Smart card
	PC with Phoenix service software
	Measurement equipment
Cables	
PCS-1	DC power cable
XCS-4	Modular cable

Type	Description
XRS-6	RF cable
	USB cable
	GPIB control cable

RF testing concept with RF coupler

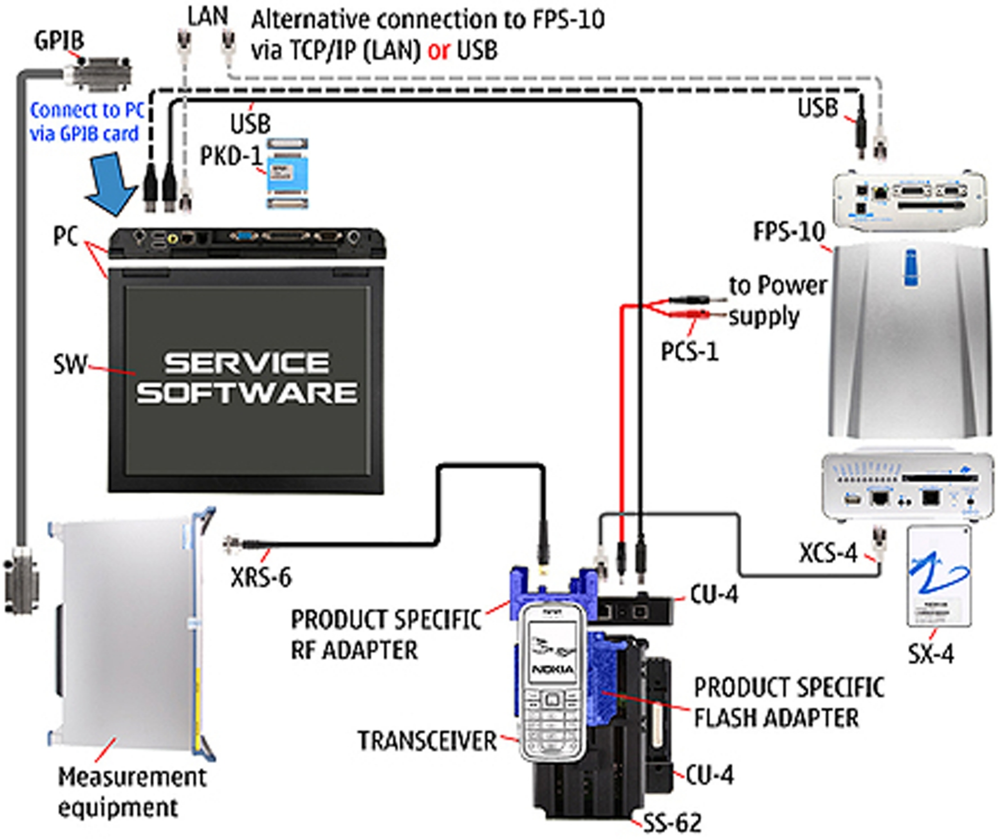

LAN
Alternative connection to FPS-10
via TCP/IP (LAN) or USB
GPIB
Connect to PC
via GPIB card
USB
PKD-1
USB
PC
FPS-10
to Power
supply
PCS-1
SW
SERVICE
SOFTWARE
XCS-4
XRS-6
CU-4
PRODUCT SPECIFIC
RF ADAPTER
SX-4
PRODUCT SPECIFIC
FLASH ADAPTER
TRANSCEIVER
CU-4
Measurement
equipment
SS-62

Figure 31 RF testing concept with RF coupler

Type	Description
Product specific tools	
FS-47	Flash adapter
SA-123	RF coupler
Other tools	
CU-4	Control unit
SX-4	Smart card
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
	Measurement equipment
	PC with Phoenix service software

Type	Description
Cables	
PCS-1	Power cable
XCS-4	Modular cable
XRS-6	RF cable
	GPIB control cable
	USB cable

Service concept for RF testing and RF/BB tuning

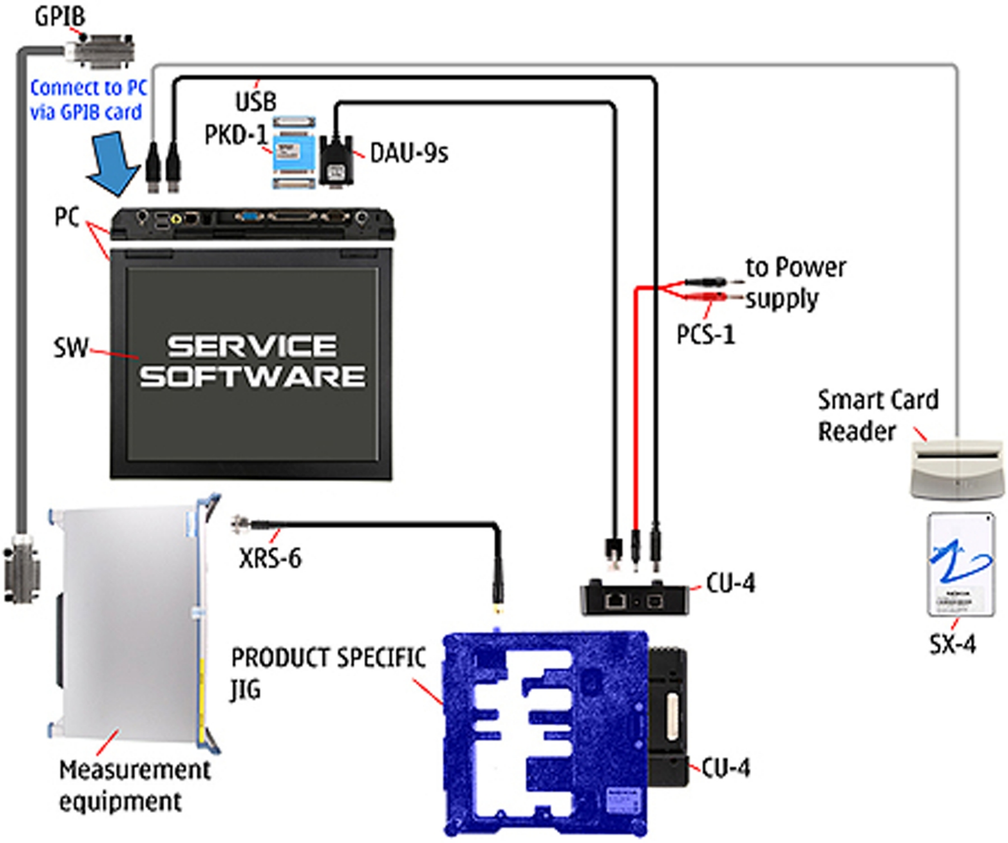

GPIB
Connect to PC via GPIB card
USB
PKD-1
DAU-9s
PC
to Power supply
PCS-1
SW
SERVICE SOFTWARE
Smart Card Reader
XRS-6
CU-4
SX-4
PRODUCT SPECIFIC JIG
Measurement equipment
CU-4

Figure 32 Service concept for RF testing and RF/BB tuning

Type	Description
Product specific tools	
MJ-122	Module jig
Other tools	
CU-4	Control unit
SX-4	Smart card
	Measurement equipment
	Smart card reader

Type	Description
	PC with Phoenix service software
Cables	
DAU-9s	MBUS cable
PCS-1	DC power cable
PKD-1/PK-1	SW security device
XRS-6	RF cable
	GPIB control cable
	USB cable

5 — Disassembly and reassembly instructions

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Table of Contents

Disassembly instructions 5–5
Assembly hints 5–12

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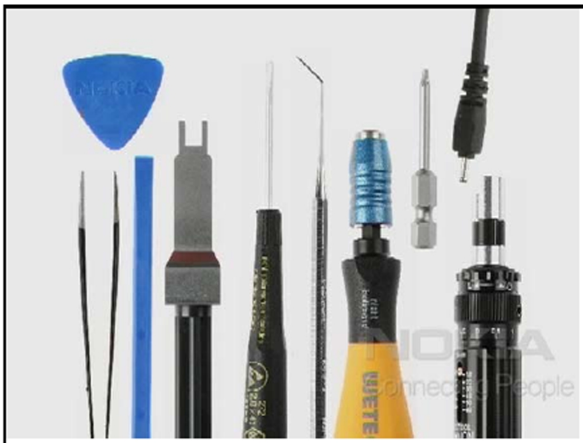
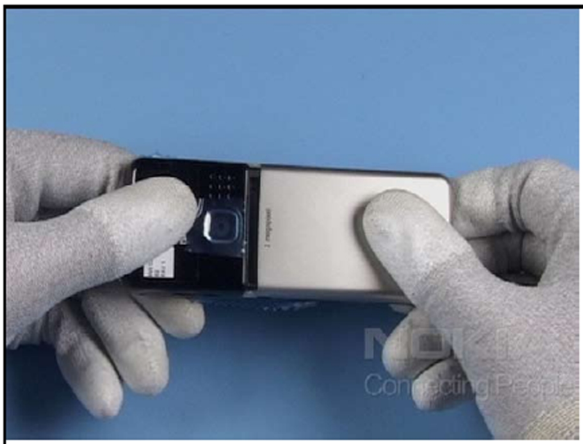
Disassembly instructions

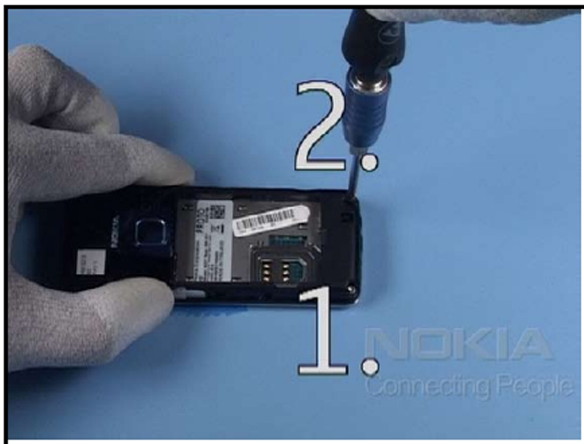


1. Needed tools: SRT-6, metal tweezers, SS-93, SS-45 camera removal tool, a straight bladed screwdriver, dental pick, bit holder with a torx plus size 6 bit, a torque driver, DC plug

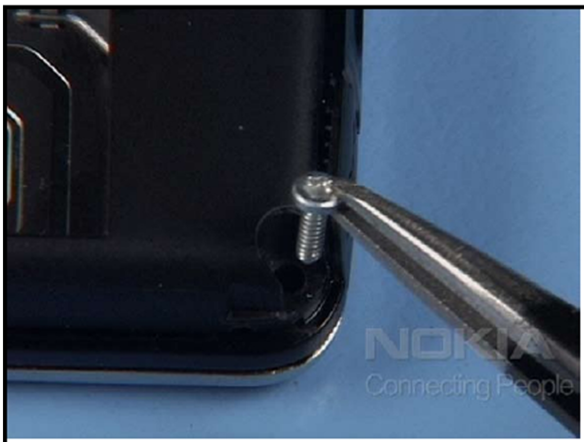
2. Always cover the windows with a protective film.



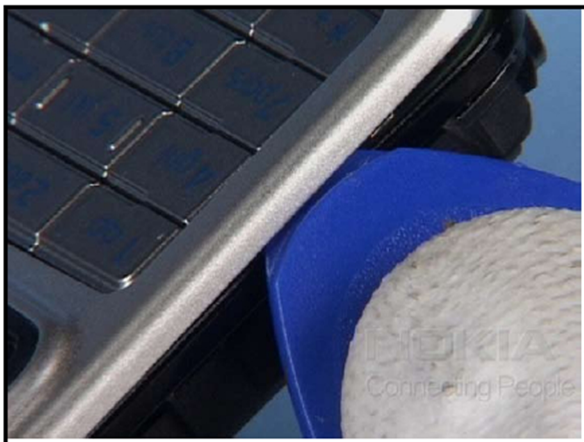
3. Shift out the C-COVER.



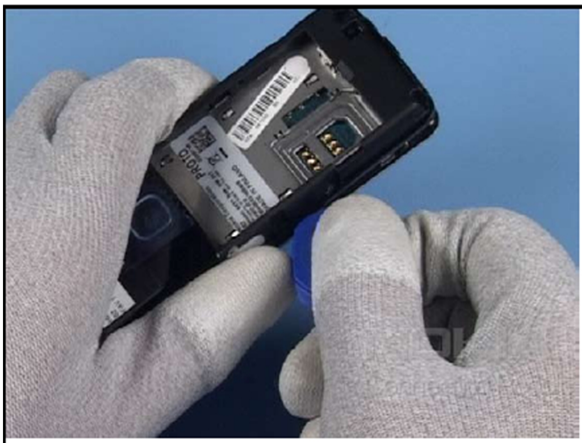
4. Remove both screws in the order shown.



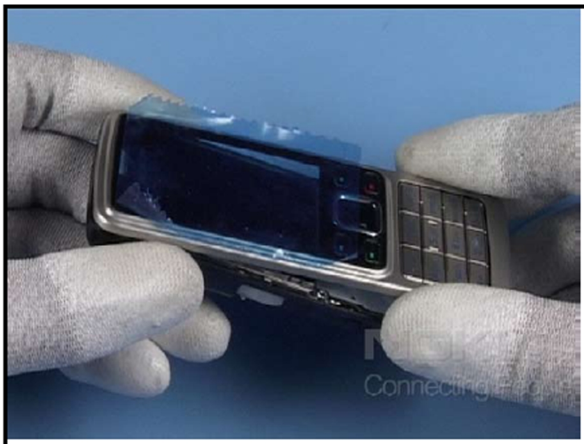
5. Remove the screws.



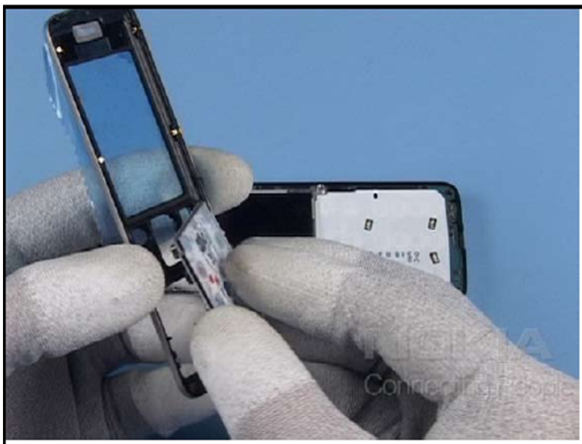
6. Unlock the plastic clips of the A-COVER with the SRT-6...



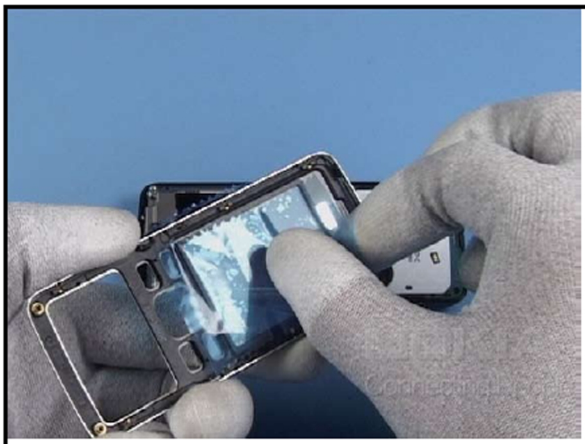
7. ...on both sides.



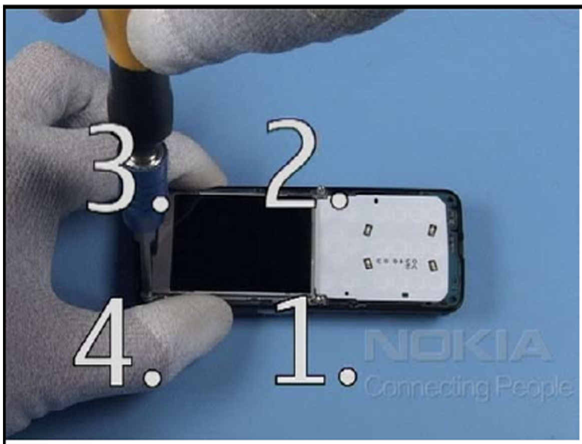
8. Lift up the cover now.



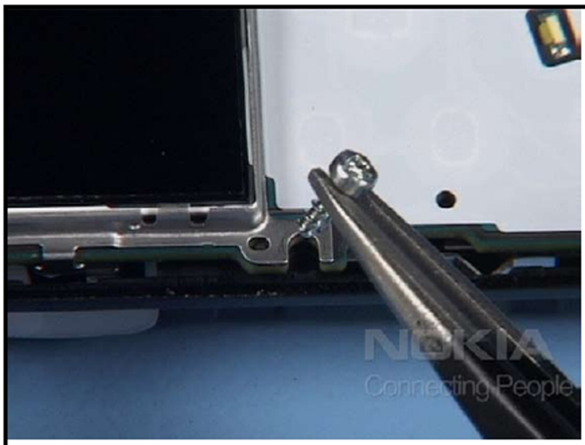
9. Remove the KEYMAT



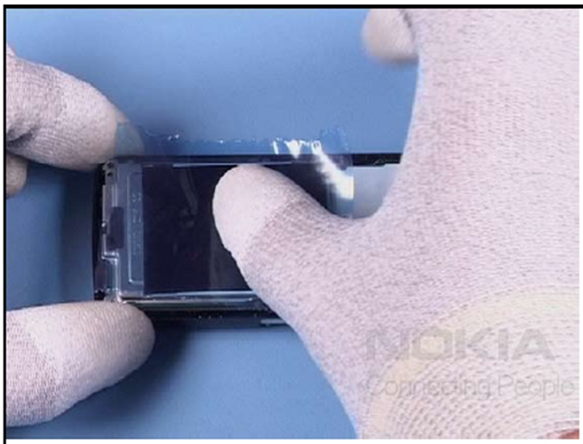
10. Protect the window from inner side.



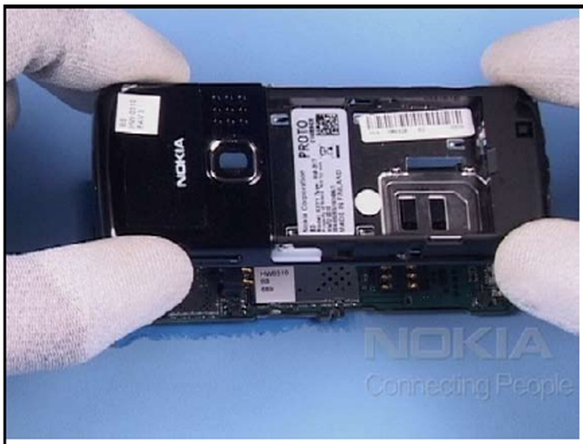
11. Unscrew the four screws in the order shown.



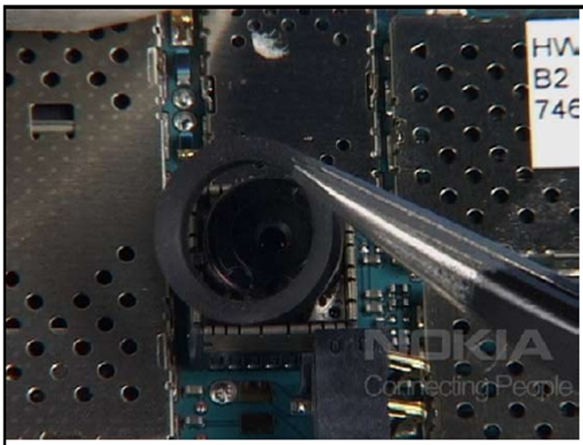
12. Remove the screws. Separate these screws, do not mismatch them with the others.


NOKIA
Connecting People

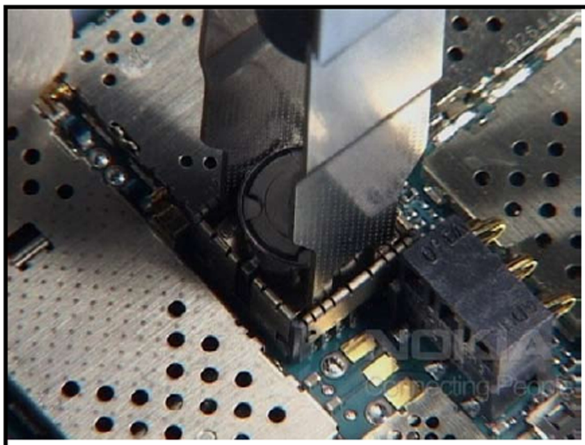
13. Cover the display with a film.


NOKIA
PROTO
NOKIA
Connecting People

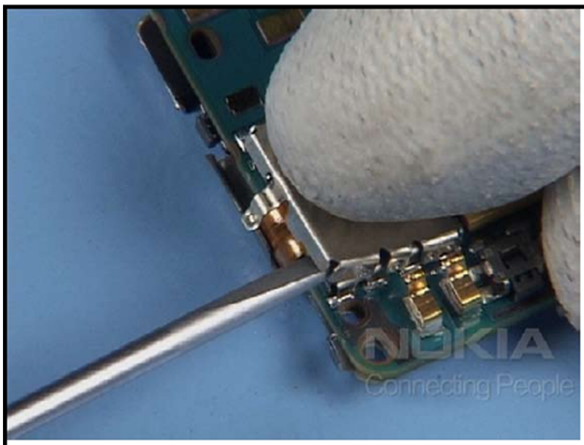
14. Turn the assembly, lift up the B-COVER.


HW
B2
746
NOKIA
Connecting People

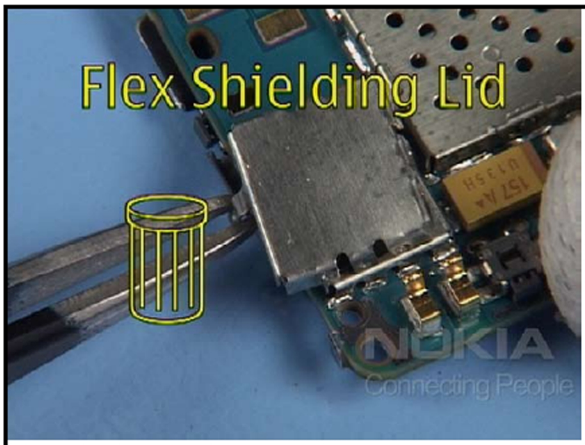
15. Remove the CAMERA GASKET.


NOKIA
Connecting People

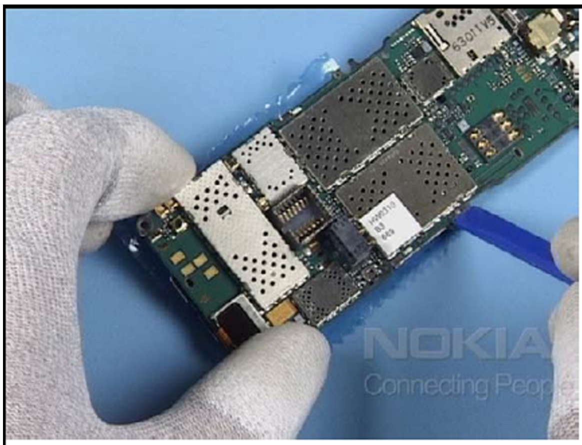
16. Unlock and remove the CAMERA with the SS-45.


NOKIA
Connecting People

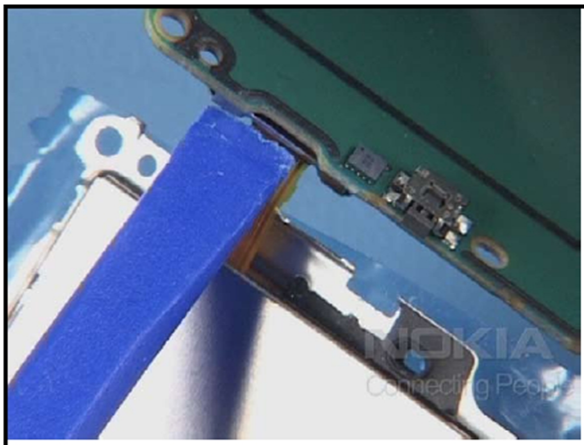
17. Release the FLEX SHIELDING LID and discard it.


Flex Shielding Lid
NOKIA
Connecting People

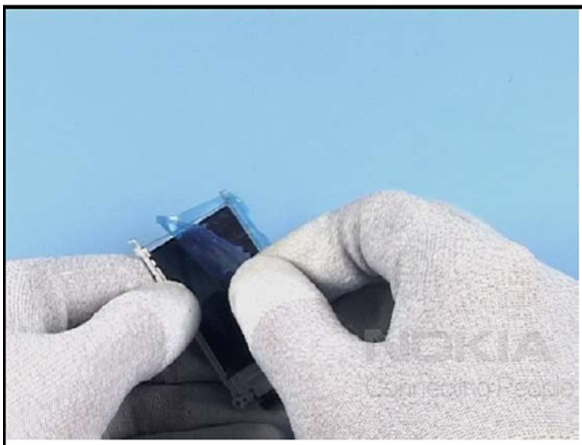
18. Do not use it again.



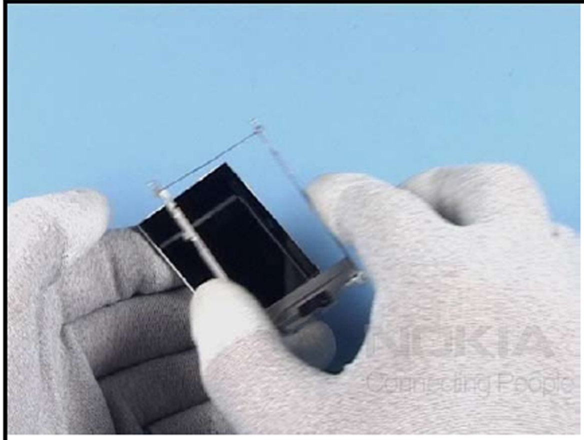
19. Unlock both metal clips of the UI SHIELD.



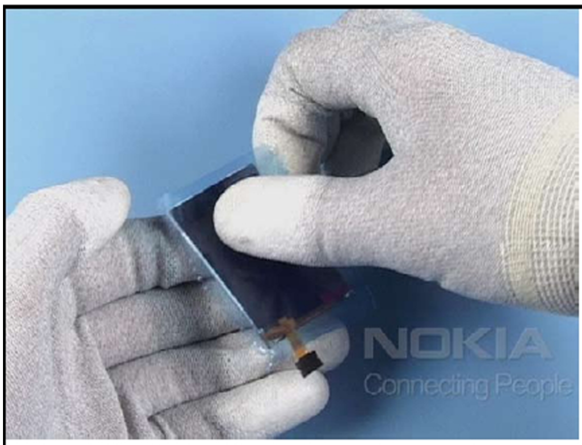
20. Carefully unlock the flex connector of the LCD MODULE.



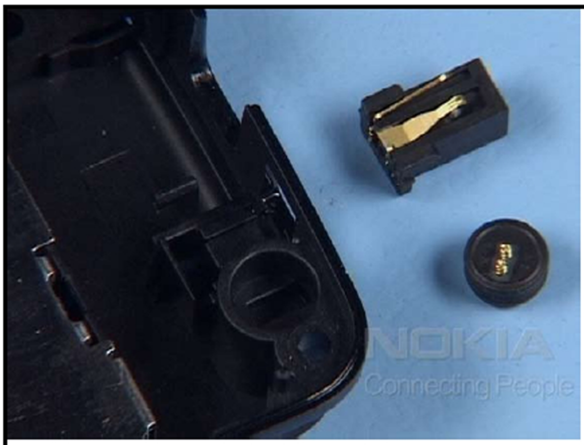
21. Peel up the protective film.



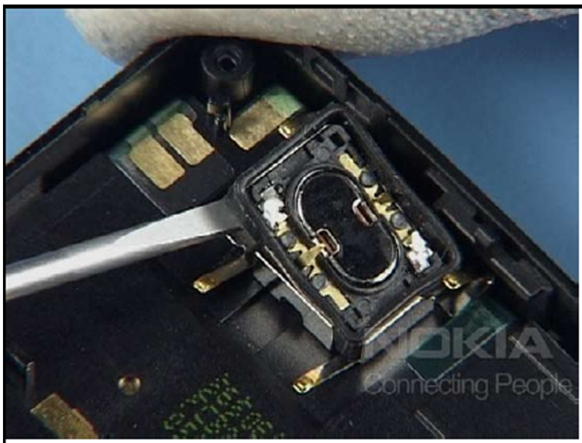
22. Now separate the parts as shown.



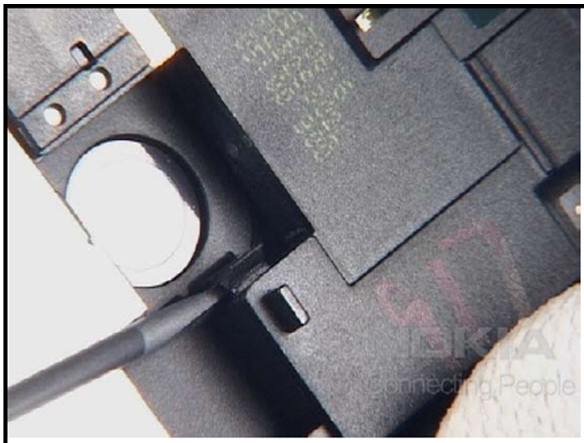
23. Cover the display with a film again.



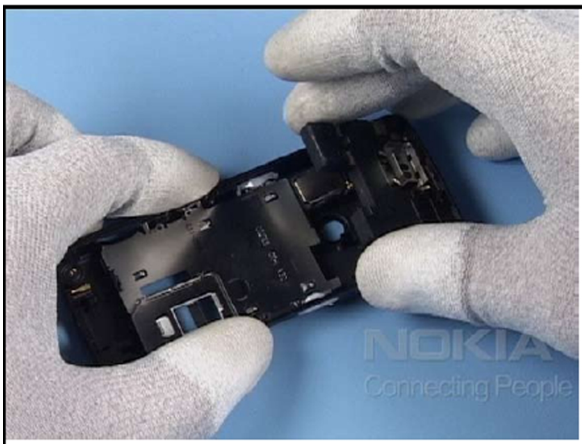
24. Remove the MICROPHONE and the DC JACK.



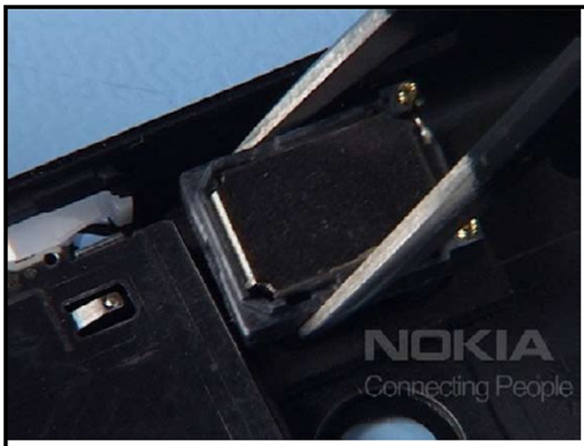
25. Carefully lever out the EARPIECE ASSEMBLY.



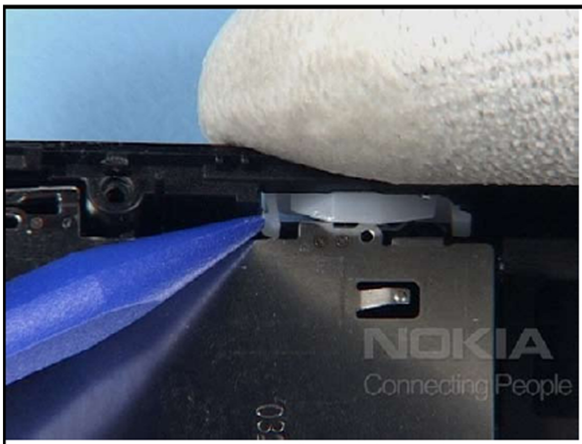
26. Carefully unlock the clip securing the PLASTIC CHAMBER.



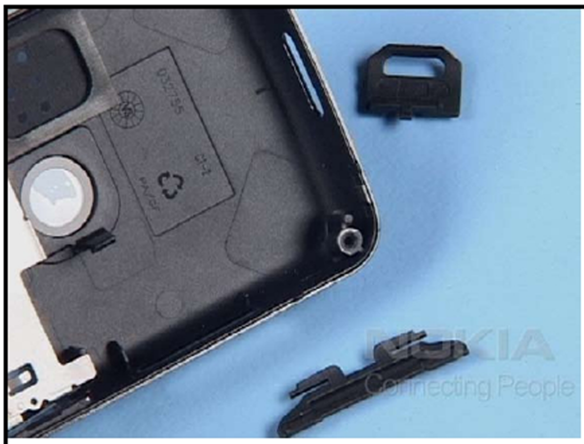
27. Now remove it.



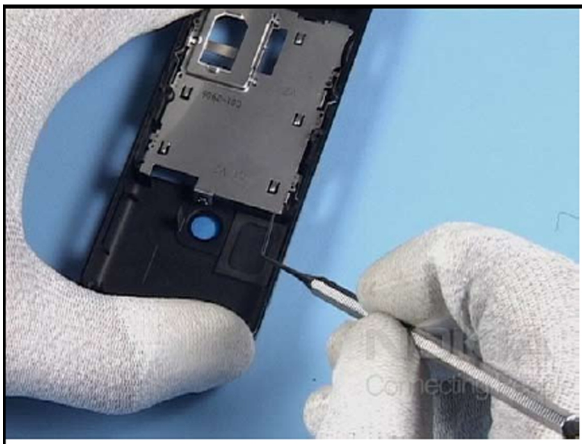
28. The IHF SPEAKER is not glued and can be removed easily.



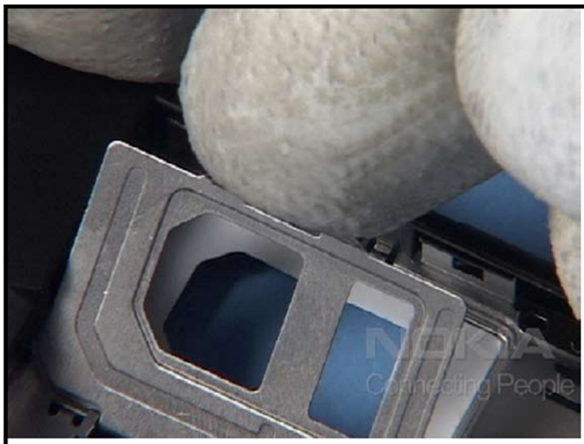
29. Carefully release the clips of the LED- and the SIDE WINDOW.



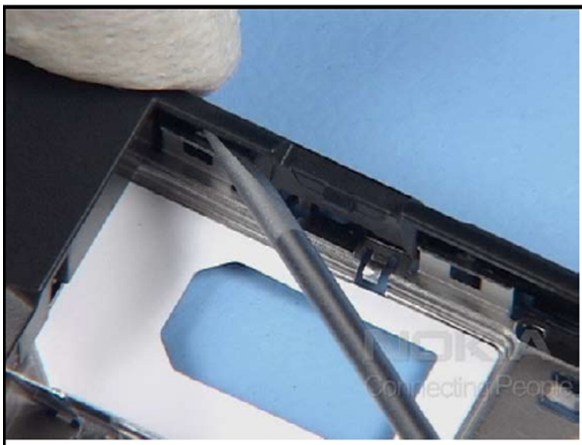
30. The POWER- and the VOLUME KEY can be removed easily.



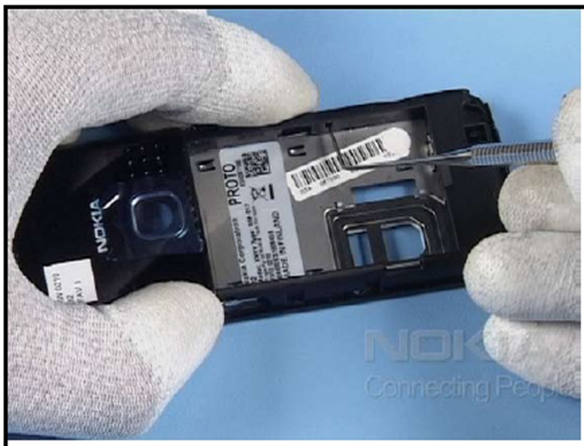
31. Release the shown metal snaps of the LABEL COVER ASSY with the dental pick.



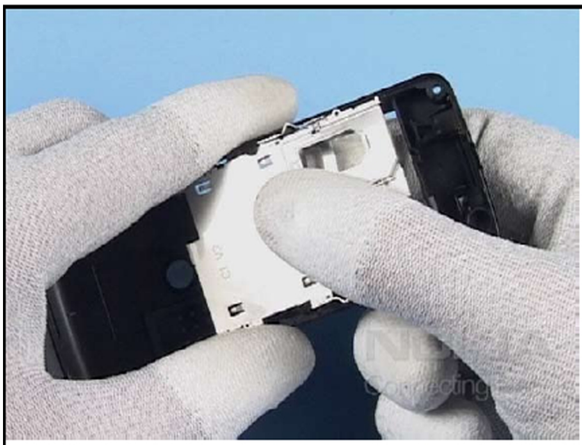
32. Turn the assembly and open the SIM lid.



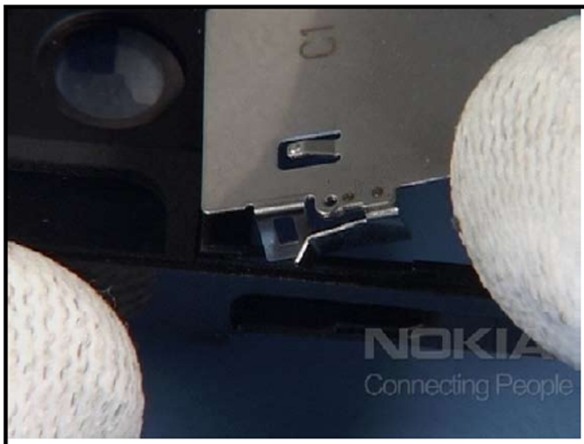
33. Now release these two latches.



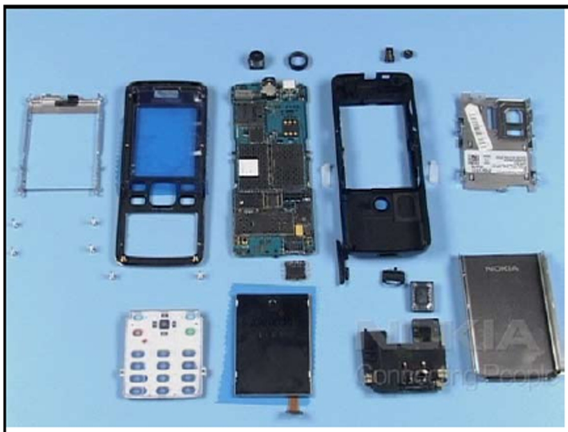
34. Use the dental tool to push out the last clips.



35. Release the LABEL COVER ASSEMBLY, beginning from the bottom side.



36. Mind these clips.



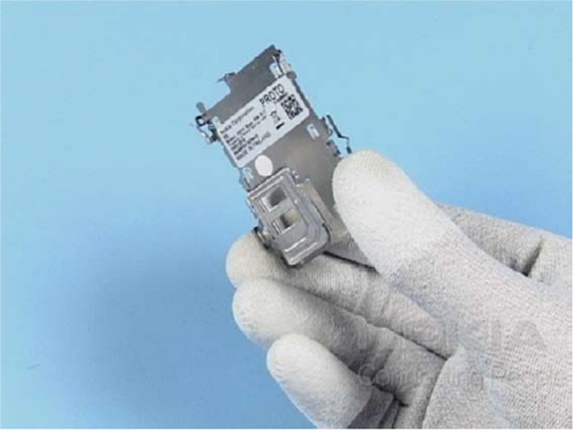
37. The disassembly procedure is now completed.

Note: Antenna Module is marked 850 or 900 to enable identification of different versions by regions.

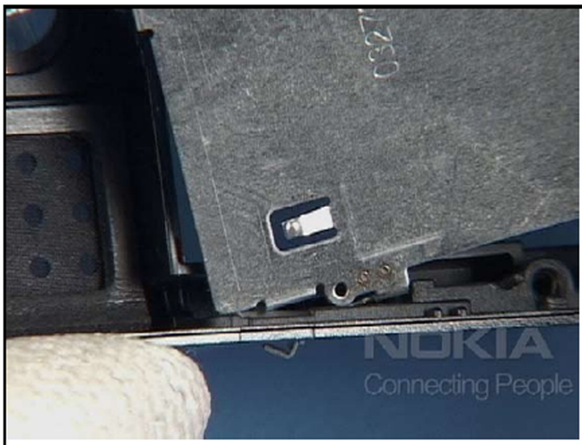
Assembly hints

Assembly hints

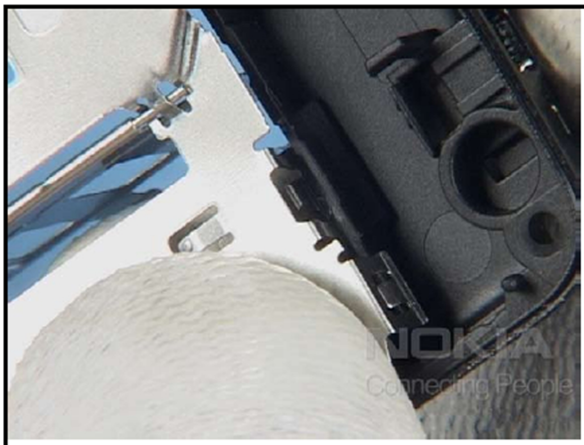
1. Assembly hints:



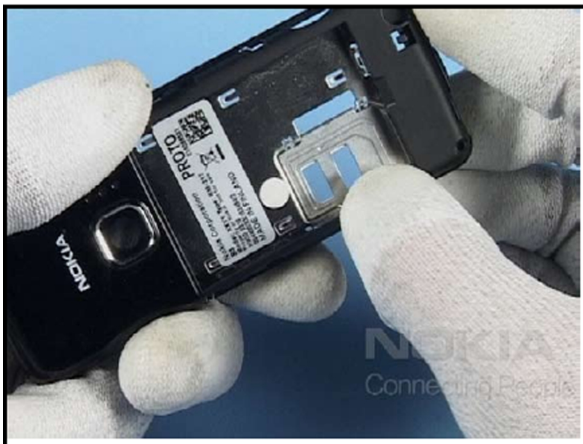
2. Keep in mind that the LABEL COVER ASSEMBLY with the TYPE LABEL must always be assembled together with the corresponding engine module.



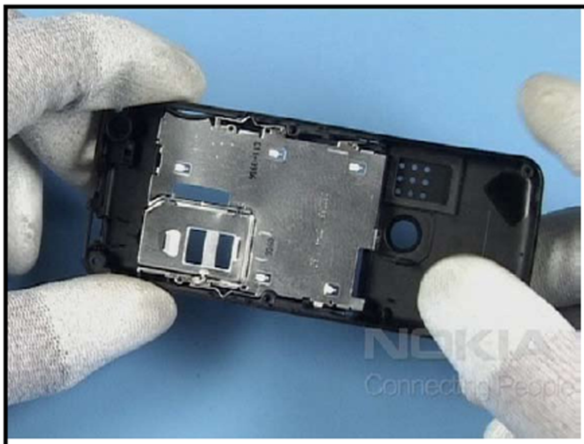
3. Insert the LABEL COVER ASSEMBLY into the B-COVER as shown.



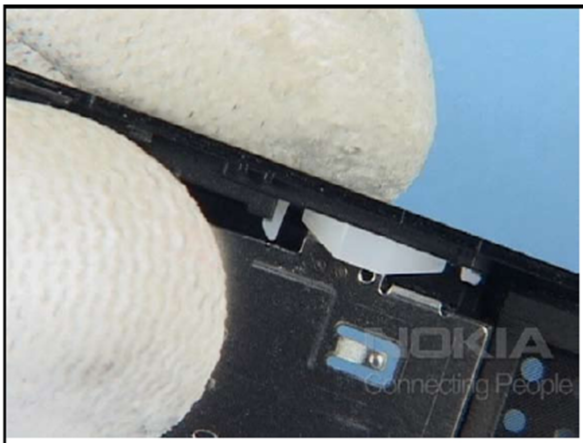
4. Carefully push all latches into their places.



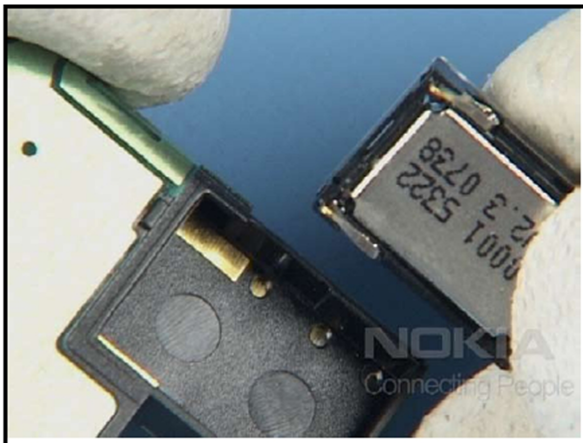
5. Close the SIM lid.



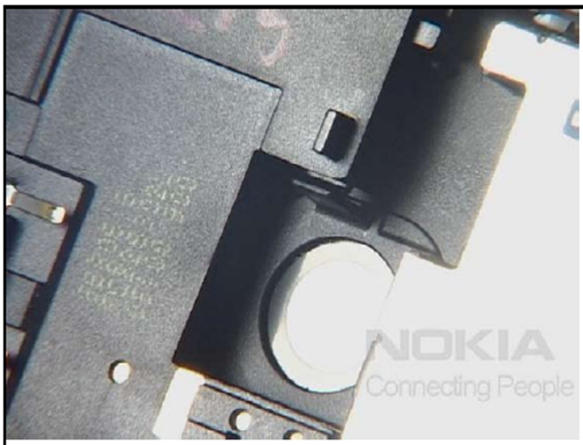
6. Check the correct positioning of all these latches.


NOKIA
Connecting People

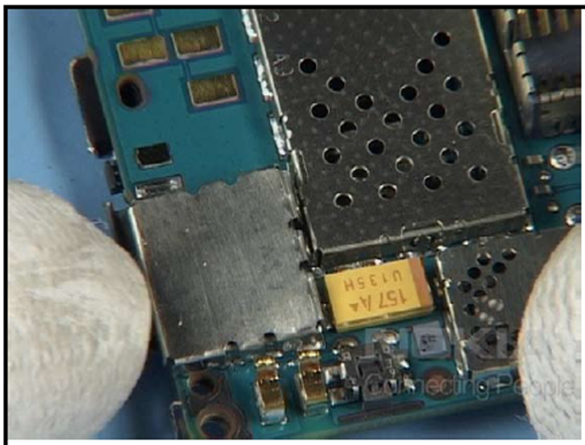
7. Insert the LED- and the SIDE- WINDOW. Note that they can't be interchanged.


NOKIA
Connecting People

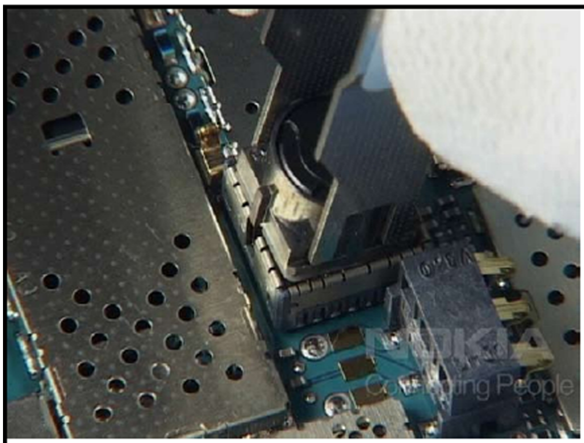
8. Note that the IHF SPEAKER contacts belongs to their pads.


NOKIA
Connecting People

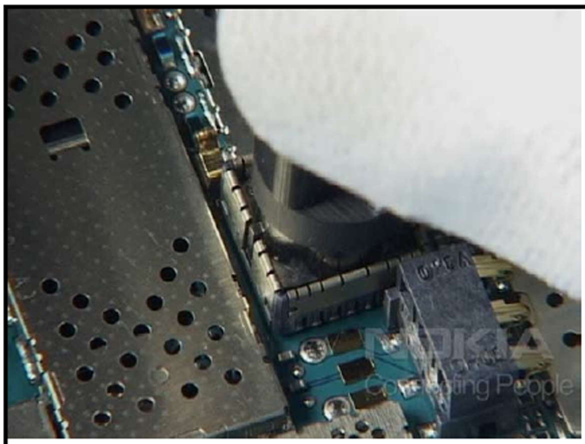
9. Secure all clips of the PLASTIC CHAMBER before going on.


NOKIA
Connecting People

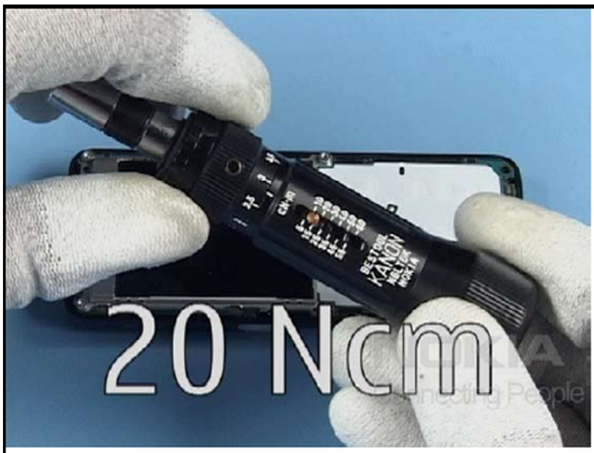
10. Always use a new FLEX SHIELDING LID.


NOKIA
Connecting People

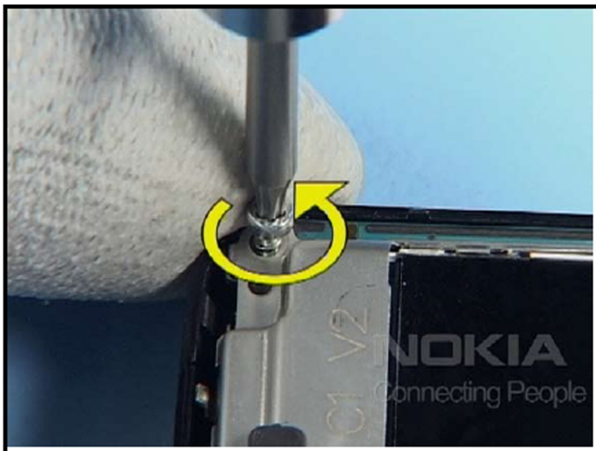
11. Mind the guiding tab while replacing the CAMERA.


NOKIA
Connecting People

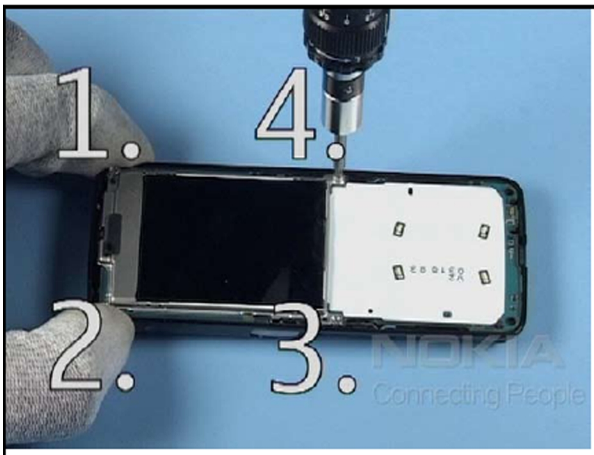
12. Push it into its place.



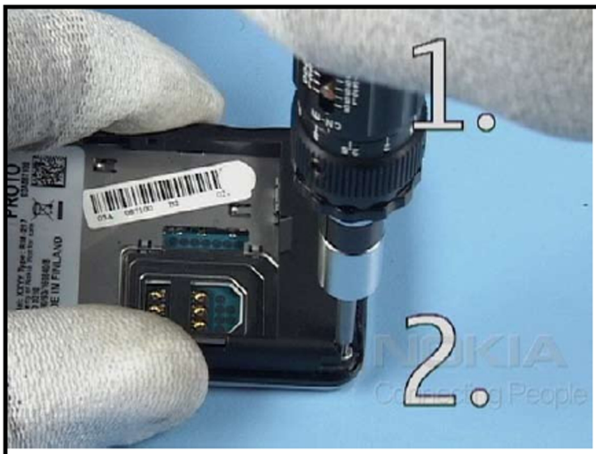
13. Set the correct torque.



14. Turn the screws to the left first to engage the threads, then tighten them slightly.



15. Apply the correct torque to all screws in the order shown.



16. Tighten both screws of the C-COVER in the order shown, too.

Note: Antenna Module is marked 850 or 900 to enable identification of different versions by regions.

6 — BB Troubleshooting and Manual Tuning Guide

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Baseband troubleshooting overview

This section is intended to be a guide for localising and repairing electrical faults.

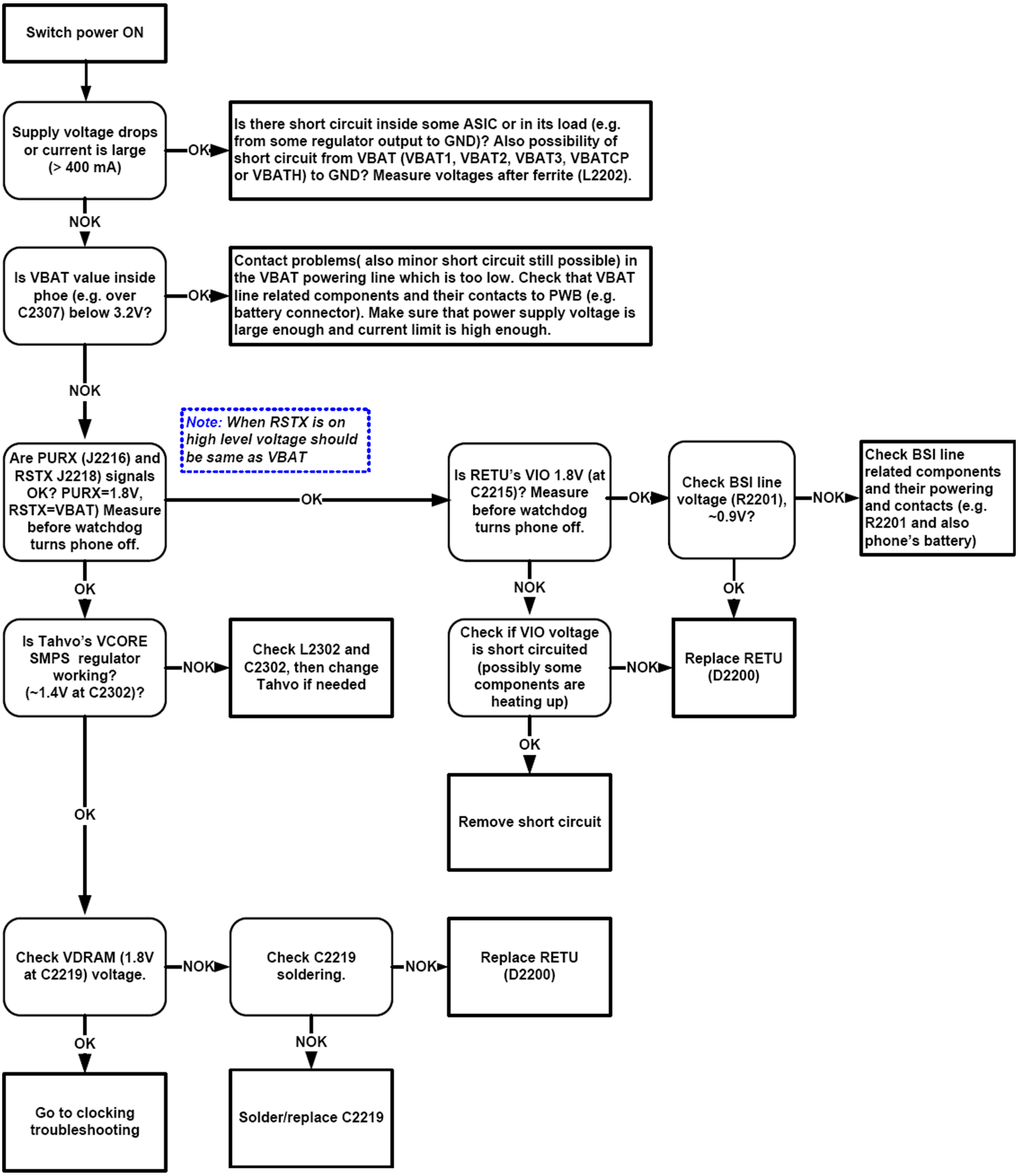
The table below tells you what troubleshooting to go to.

Problem	Troubleshooting
Abnormal current consumption	1 General power checking (page 6–6) 2 Battery current measuring fault (page 6–7)
Flashing does not work or the problem is not clearly defined	1 Flashing (page 6–15) 2 Clocking (page 6–9) 3 Combo memory (page 6–14)
Charging does not work	Charging (page 6–8)
Display does not work	Display fault (page 6–20)
Backlights do not work	1 Backlight (page 6–23) 2 LED driver (page 6–8)
Reminder LEDs do not work	Reminder LED (page 6–24)
USB does not work	USB (page 6–43)
Audio (mic, earpiece, IHF) does not work	1 Audio (page 6–26) 2 Acoustics (page 6–26)
Camera does not work	1 Camera baseband hardware (page 6–11) 2 Camera viewfinder (page 6–12) 3 Bad image quality (page 6–13)
Bluetooth does not work	Bluetooth (BT) (page 6–37)
FM radio does not work	FM radio (page 6–17)
MicroSD card does not work	MicroSD card (page 6–18)

Power and charging troubleshooting

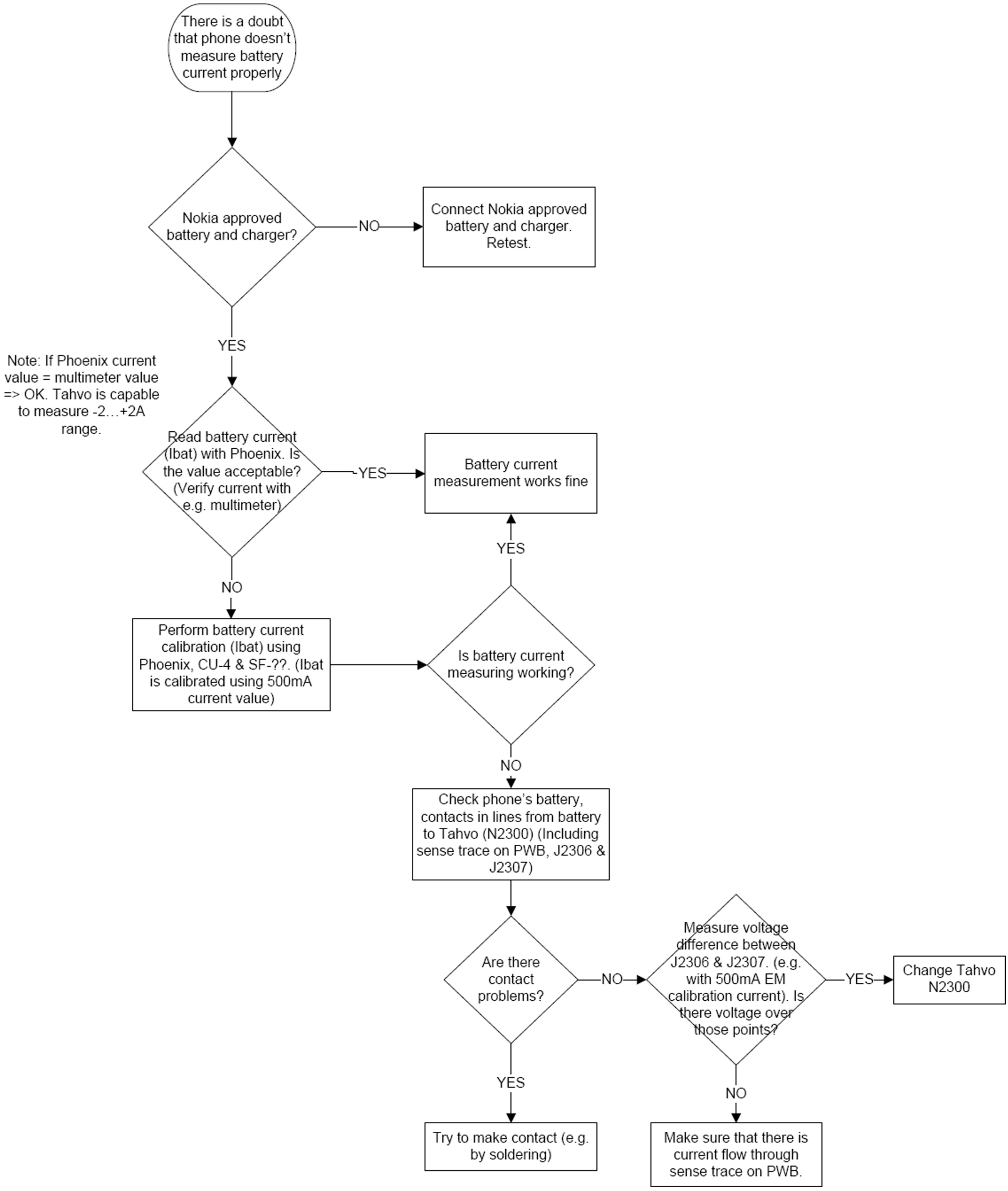
General power checking troubleshooting

Troubleshooting flow


Switch power ON
Supply voltage drops or current is large (> 400 mA)
OK
Is there short circuit inside some ASIC or in its load (e.g. from some regulator output to GND)? Also possibility of short circuit from VBAT (VBAT1, VBAT2, VBAT3, VBATCP or VBATH) to GND? Measure voltages after ferrite (L2202).
NOK
Is VBAT value inside phoe (e.g. over C2307) below 3.2V?
OK
Contact problems(also minor short circuit still possible) in the VBAT powering line which is too low. Check that VBAT line related components and their contacts to PWB (e.g. battery connector). Make sure that power supply voltage is large enough and current limit is high enough.
NOK
Note: When RSTX is on high level voltage should be same as VBAT
Are PURX (J2216) and RSTX J2218) signals OK? PURX=1.8V, RSTX=VBAT) Measure before watchdog turns phone off.
OK
Is RETU's VIO 1.8V (at C2215)? Measure before watchdog turns phone off.
OK
Check BSI line voltage (R2201), ~0.9V?
NOK
Check BSI line related components and their powering and contacts (e.g. R2201 and also phone's battery)
OK
Replace RETU (D2200)
NOK
Check if VIO voltage is short circuited (possibly some components are heating up)
NOK
OK
Remove short circuit
OK
Is Tahvo's VCORE SMPS regulator working? (~1.4V at C2302)?
NOK
Check L2302 and C2302, then change Tahvo if needed
OK
Check VDRAM (1.8V at C2219) voltage.
NOK
Check C2219 soldering.
NOK
Replace RETU (D2200)
OK
Go to clocking troubleshooting
NOK
Solder/replace C2219

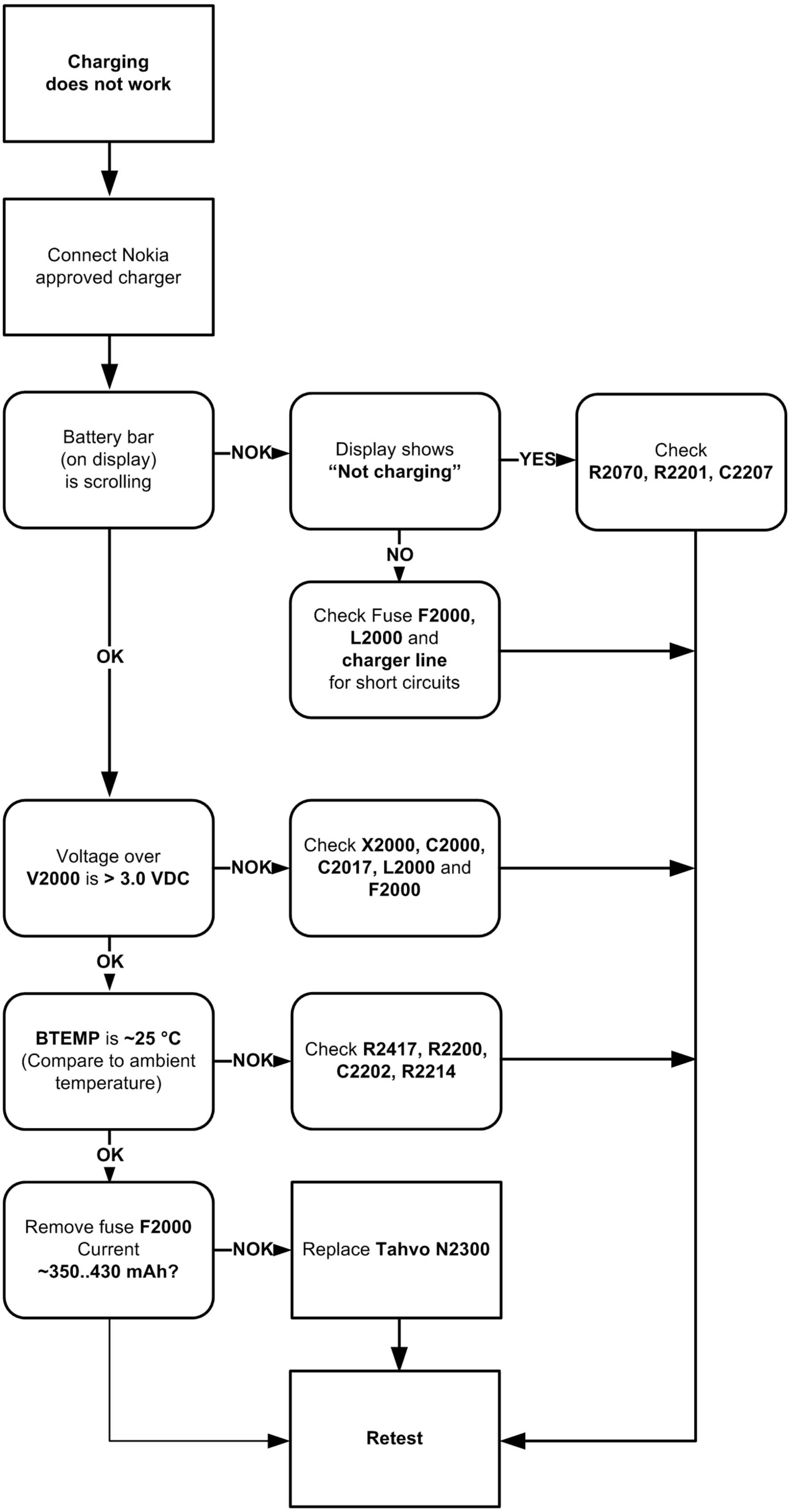
Battery current measuring fault troubleshooting

Troubleshooting flow


There is a doubt that phone doesn't measure battery current properly
Nokia approved battery and charger?
NO
Connect Nokia approved battery and charger. Retest.
YES
Note: If Phoenix current value = multimeter value => OK. Tahvo is capable to measure -2…+2A range.
Read battery current (Ibat) with Phoenix. Is the value acceptable? (Verify current with e.g. multimeter)
YES
Battery current measurement works fine
NO
Perform battery current calibration (Ibat) using Phoenix, CU-4 & SF-??. (Ibat is calibrated using 500mA current value)
YES
Is battery current measuring working?
NO
Check phone's battery, contacts in lines from battery to Tahvo (N2300) (Including sense trace on PWB, J2306 & J2307)
Are there contact problems?
NO
Measure voltage difference between J2306 & J2307. (e.g. with 500mA EM calibration current). Is there voltage over those points?
YES
Change Tahvo N2300
YES
Try to make contact (e.g. by soldering)
NO
Make sure that there is current flow through sense trace on PWB.

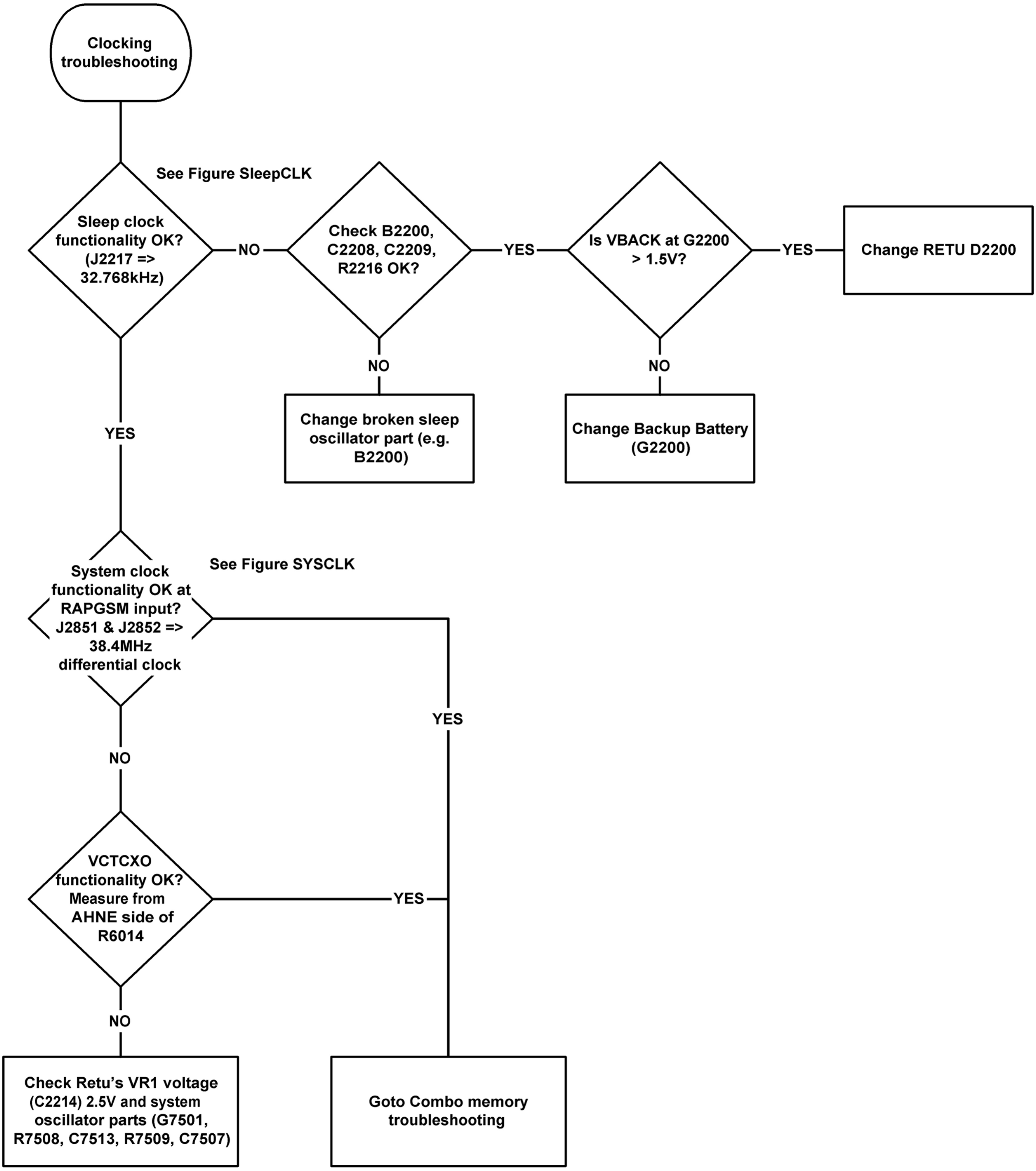
Charging troubleshooting

Troubleshooting flow


Charging does not work
Connect Nokia approved charger
Battery bar (on display) is scrolling
NOK
Display shows "Not charging"
YES
Check R2070, R2201, C2207
NO
Check Fuse F2000, L2000 and charger line for short circuits
OK
Voltage over V2000 is > 3.0 VDC
NOK
Check X2000, C2000, C2017, L2000 and F2000
OK
BTEMP is ~25 °C (Compare to ambient temperature)
NOK
Check R2417, R2200, C2202, R2214
OK
Remove fuse F2000 Current ~350..430 mAh?
NOK
Replace Tahvo N2300
Retest

Clocking troubleshooting

Troubleshooting flow


Clocking troubleshooting
See Figure SleepCLK
Sleep clock functionality OK? (J2217 => 32.768kHz)
NO
Check B2200, C2208, C2209, R2216 OK?
YES
Is VBACK at G2200 > 1.5V?
YES
Change RETU D2200
NO
Change broken sleep oscillator part (e.g. B2200)
NO
Change Backup Battery (G2200)
YES
See Figure SYSCLK
System clock functionality OK at RAPGSM input? J2851 & J2852 => 38.4MHz differential clock
YES
NO
VCTCXO functionality OK? Measure from AHNE side of R6014
YES
NO
Check Retu's VR1 voltage (C2214) 2.5V and system oscillator parts (G7501, R7508, C7513, R7509, C7507)
Goto Combo memory troubleshooting

Interface troubleshooting

Camera failure

Introduction to camera troubleshooting

Bad conditions often cause bad pictures. Therefore, the camera operation has to be checked in constant conditions or by using a second, known-to-be-good Nokia device as reference. Image quality is hard to measure quantitatively, and the difference between a good and a bad picture can be small. Some training or experience may be needed to detect what is actually wrong.

When checking for possible errors in camera functionality, knowing what error is suspected significantly helps the testing by narrowing down the amount of test cases. The following types of image quality problems are common:

- Dust (black spots)
- Lack of sharpness
- Bit errors

Taking and evaluating test pictures

When *taking* a test picture, remember the following:

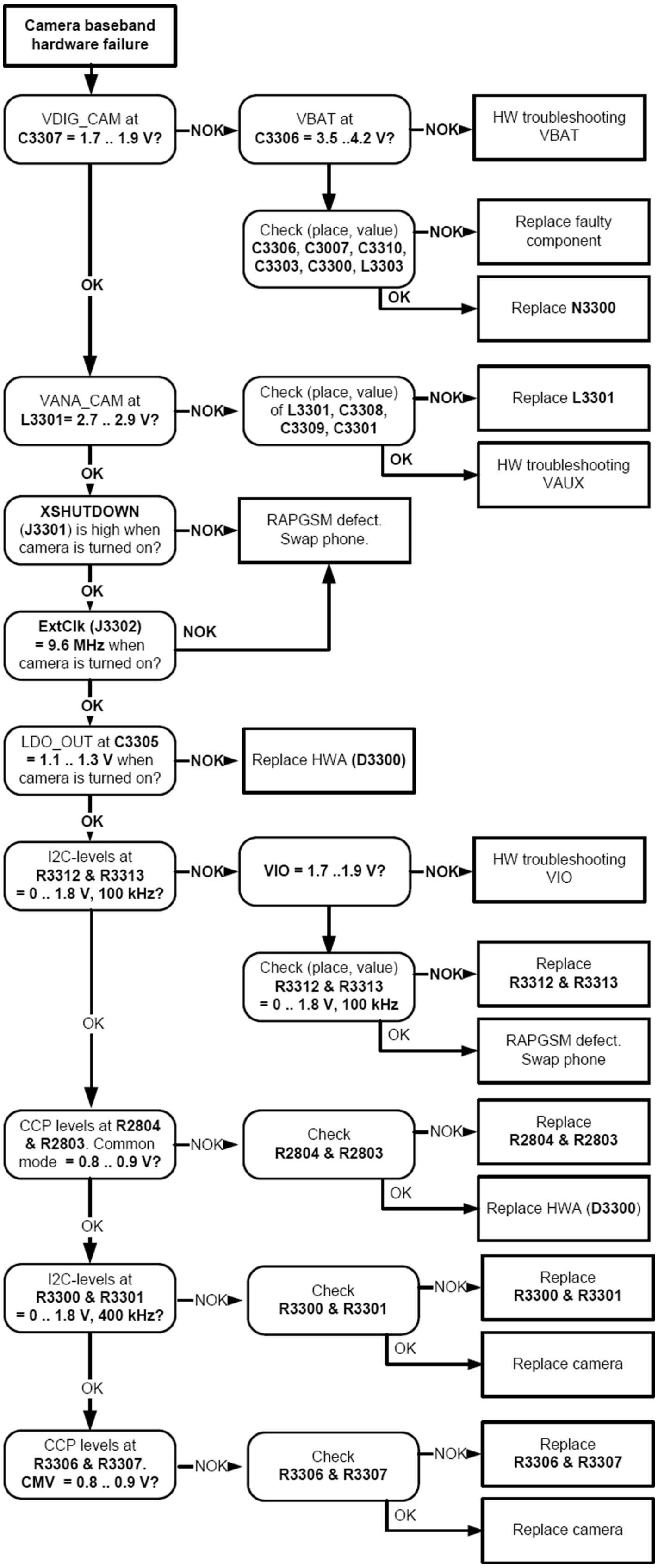
- Avoid bright fluorescent light, 50/60Hz electrical network or high artificial illumination levels
- If the phone is hot, let it rest for a while before taking the picture
- Make sure the optical system is clean
- Use highest possible resolution
- Make sure the light is suffiecient (bright office lightning)
- Do not take the picture towards light source
- Be as still as possible when taking the picture
- Distance should be at least 40cm, 1-2m is recommended

When *evaluating* a test picture, remember the following:

- The center of the picture is sharper than the edges
- The image may be blurred, though it does not show in the viewfinder
- Analyse the picture from your PC monitor, full colour setting is recommended
- If possible, compare with a picture of the same motive taken with a similar Nokia device

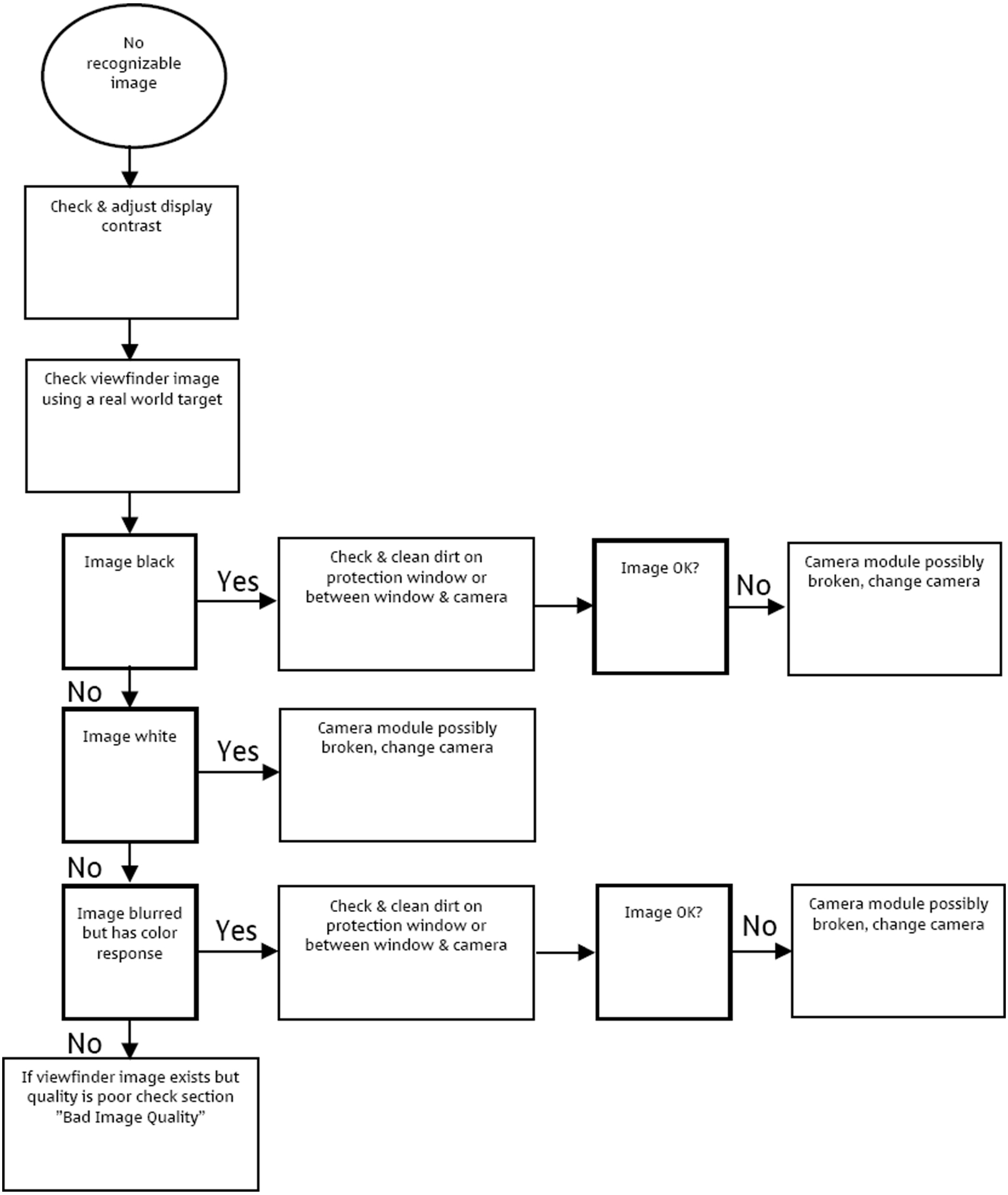
Camera hardware troubleshooting

Troubleshooting flow


Camera baseband hardware failure
VDIG_CAM at C3307 = 1.7 .. 1.9 V?
NOK
VBAT at C3306 = 3.5 ..4.2 V?
NOK
HW troubleshooting VBAT
Check (place, value) C3306, C3007, C3310, C3303, C3300, L3303
NOK
Replace faulty component
OK
Replace N3300
OK
VANA_CAM at L3301= 2.7 .. 2.9 V?
NOK
Check (place, value) of L3301, C3308, C3309, C3301
NOK
Replace L3301
OK
HW troubleshooting VAUX
OK
XSHUTDOWN (J3301) is high when camera is turned on?
NOK
RAPGSM defect. Swap phone.
OK
ExtClk (J3302) = 9.6 MHz when camera is turned on?
NOK
OK
LDO_OUT at C3305 = 1.1 .. 1.3 V when camera is turned on?
NOK
Replace HWA (D3300)
OK
I2C-levels at R3312 & R3313 = 0 .. 1.8 V, 100 kHz?
NOK
VIO = 1.7 ..1.9 V?
NOK
HW troubleshooting VIO
Check (place, value) R3312 & R3313 = 0 .. 1.8 V, 100 kHz
NOK
Replace R3312 & R3313
OK
RAPGSM defect. Swap phone
OK
CCP levels at R2804 & R2803. Common mode = 0.8 .. 0.9 V?
NOK
Check R2804 & R2803
NOK
Replace R2804 & R2803
OK
Replace HWA (D3300)
OK
I2C-levels at R3300 & R3301 = 0 .. 1.8 V, 400 kHz?
NOK
Check R3300 & R3301
NOK
Replace R3300 & R3301
OK
Replace camera
OK
CCP levels at R3306 & R3307. CMV = 0.8 .. 0.9 V?
NOK
Check R3306 & R3307
NOK
Replace R3306 & R3307
OK
Replace camera

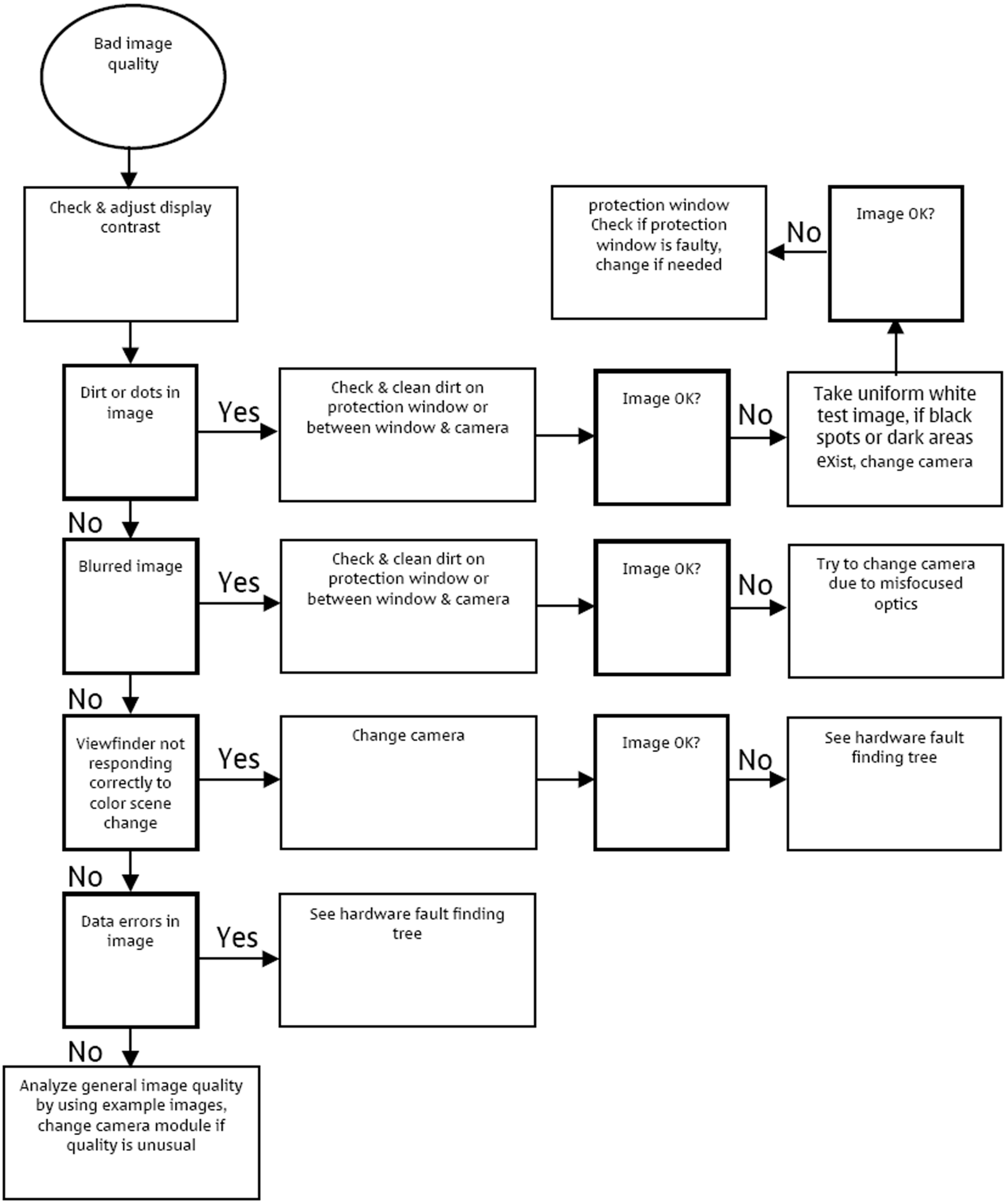
Camera viewfinder troubleshooting

Troubleshooting flow


No recognizable image
Check & adjust display contrast
Check viewfinder image using a real world target
Image black
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
Image white
Yes
Camera module possibly broken, change camera
No
Image blurred but has color response
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Camera module possibly broken, change camera
No
If viewfinder image exists but quality is poor check section "Bad Image Quality"

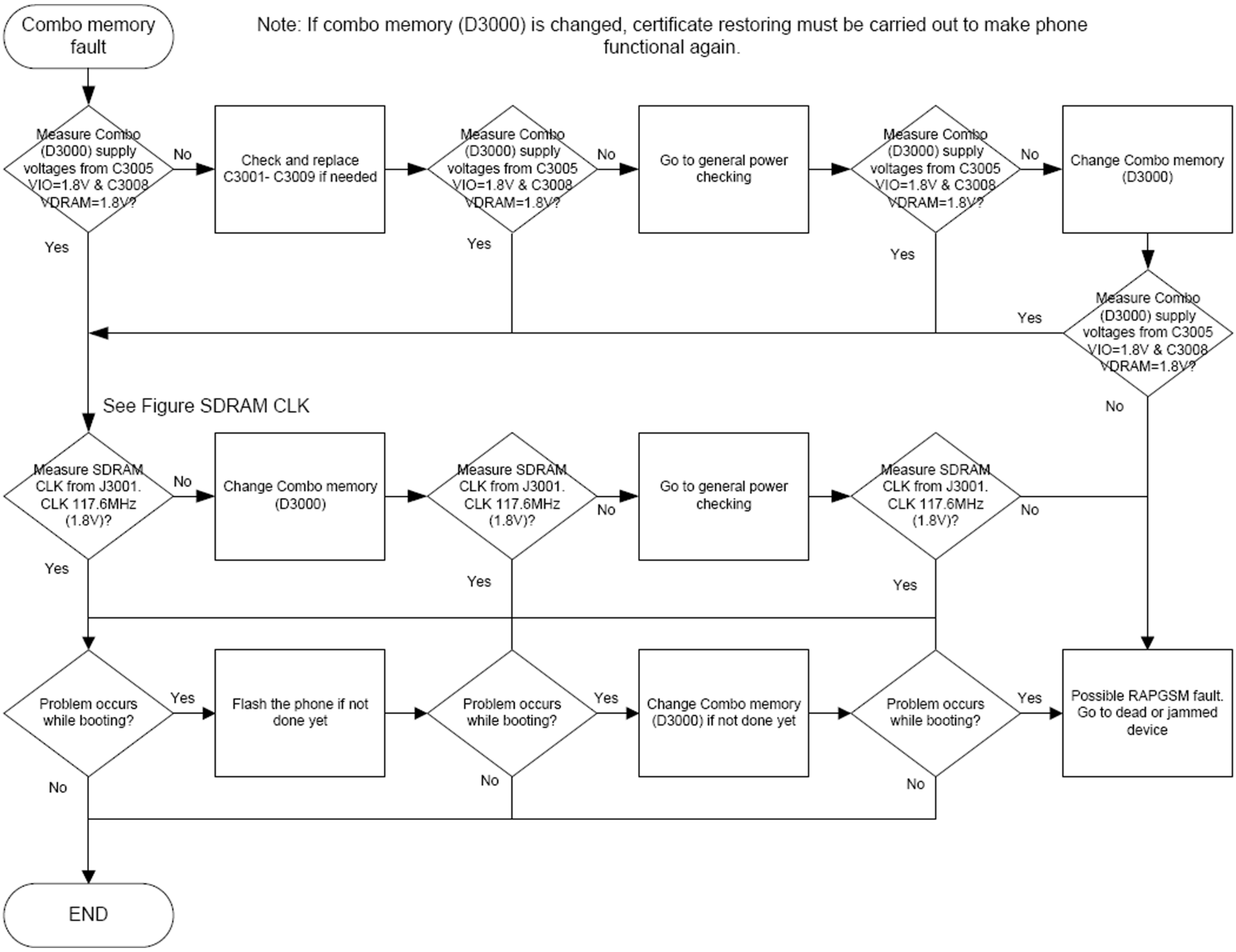
Camera: Bad image quality troubleshooting

Troubleshooting flow


Bad image quality
Check & adjust display contrast
Dirt or dots in image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Take uniform white test image, if black spots or dark areas exist, change camera
Image OK?
No
protection window Check if protection window is faulty, change if needed
No
Blurred image
Yes
Check & clean dirt on protection window or between window & camera
Image OK?
No
Try to change camera due to misfocused optics
No
Viewfinder not responding correctly to color scene change
Yes
Change camera
Image OK?
No
See hardware fault finding tree
No
Data errors in image
Yes
See hardware fault finding tree
No
Analyze general image quality by using example images, change camera module if quality is unusual

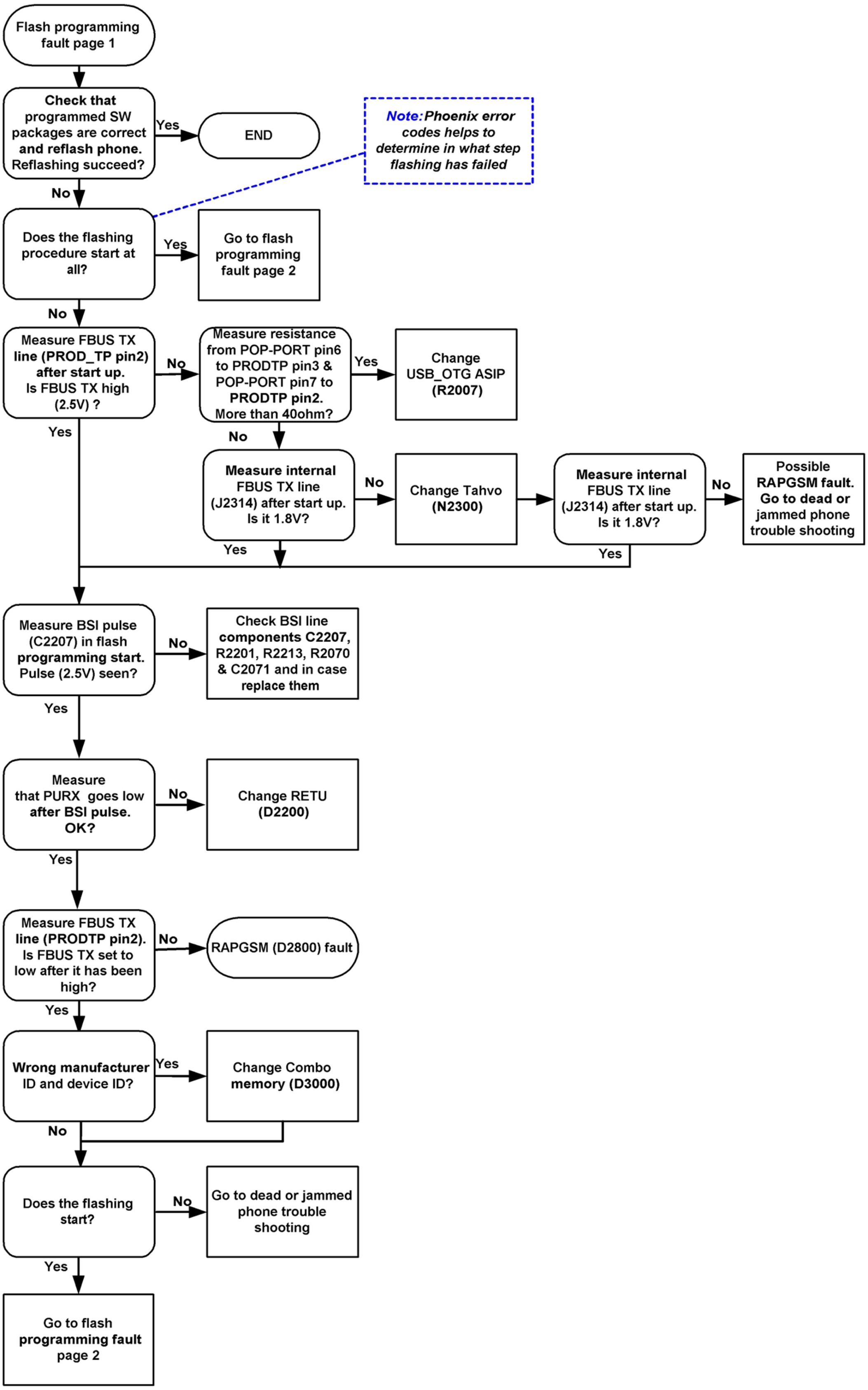
COMBO memory troubleshooting

Troubleshooting flow


Combo memory fault
Note: If combo memory (D3000) is changed, certificate restoring must be carried out to make phone functional again.
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Check and replace C3001- C3009 if needed
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Go to general power checking
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
No
Change Combo memory (D3000)
Yes
Yes
Yes
Measure Combo (D3000) supply voltages from C3005 VIO=1.8V & C3008 VDRAM=1.8V?
Yes
No
See Figure SDRAM CLK
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Change Combo memory (D3000)
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Go to general power checking
Measure SDRAM CLK from J3001. CLK 117.6MHz (1.8V)?
No
Yes
Yes
Yes
Problem occurs while booting?
Yes
Flash the phone if not done yet
Problem occurs while booting?
Yes
Change Combo memory (D3000) if not done yet
Problem occurs while booting?
Yes
Possible RAPGSM fault. Go to dead or jammed device
No
No
No
END

Flash programming fault troubleshooting

Part 1


Flash programming fault page 1
Check that programmed SW packages are correct and reflash phone. Reflashing succeed?
Yes
END
Note: Phoenix error codes helps to determine in what step flashing has failed
No
Does the flashing procedure start at all?
Yes
Go to flash programming fault page 2
No
Measure FBUS TX line (PROD_TP pin2) after start up. Is FBUS TX high (2.5V) ?
No
Measure resistance from POP-PORT pin6 to PRODTP pin3 & POP-PORT pin7 to PRODTP pin2. More than 40ohm?
Yes
Change USB_OTG ASIP (R2007)
No
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Change Tahvo (N2300)
Measure internal FBUS TX line (J2314) after start up. Is it 1.8V?
No
Possible RAPGSM fault. Go to dead or jammed phone trouble shooting
Yes
Yes
Yes
Measure BSI pulse (C2207) in flash programming start. Pulse (2.5V) seen?
No
Check BSI line components C2207, R2201, R2213, R2070 & C2071 and in case replace them
Yes
Measure that PURX goes low after BSI pulse. OK?
No
Change RETU (D2200)
Yes
Measure FBUS TX line (PRODTP pin2). Is FBUS TX set to low after it has been high?
No
RAPGSM (D2800) fault
Yes
Wrong manufacturer ID and device ID?
Yes
Change Combo memory (D3000)
No
Does the flashing start?
No
Go to dead or jammed phone trouble shooting
Yes
Go to flash programming fault page 2

Part 2

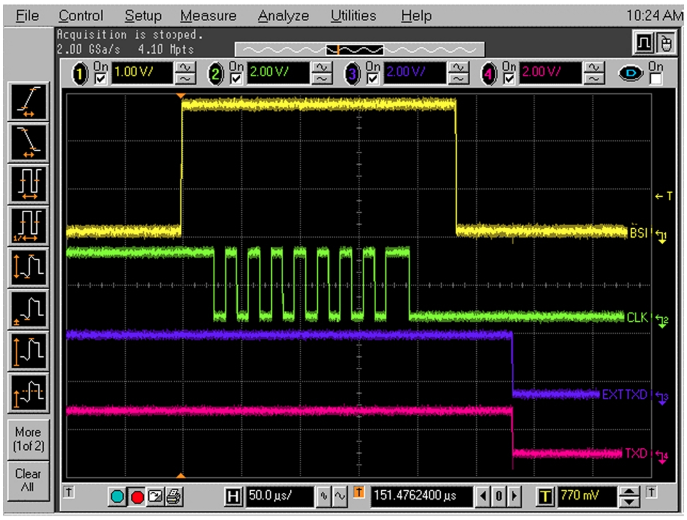

File
Control
Setup
Measure
Analyze
Utilities
Help
10:24 AM
Acquisition is stopped.
2.00 GSa/s 4.10 Mpts
1.00 V/
2.00 V/
2.00 V/
2.00 V/
BSI
CLK
EXTTXD
TXD
More (1of 2)
Clear All
50.0 µs/
151.4762400 µs
770 mV

Figure 33 Flashing pic 1. Take single trig measurement for the rise of the BSI signal.

Saved: 05 JUL 2004 13:24:19

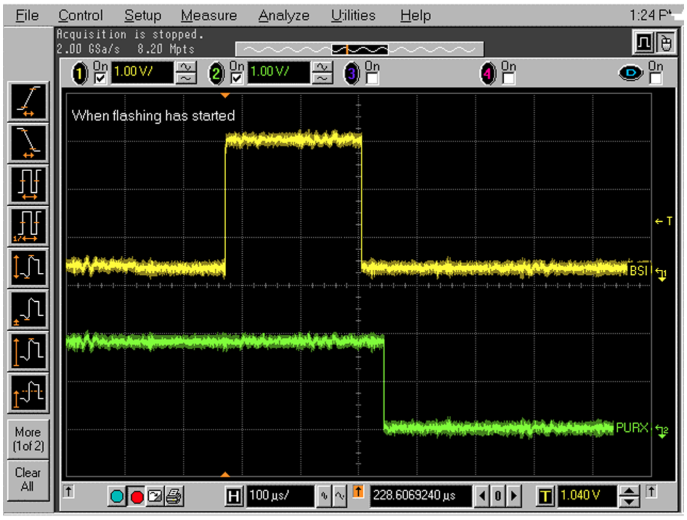
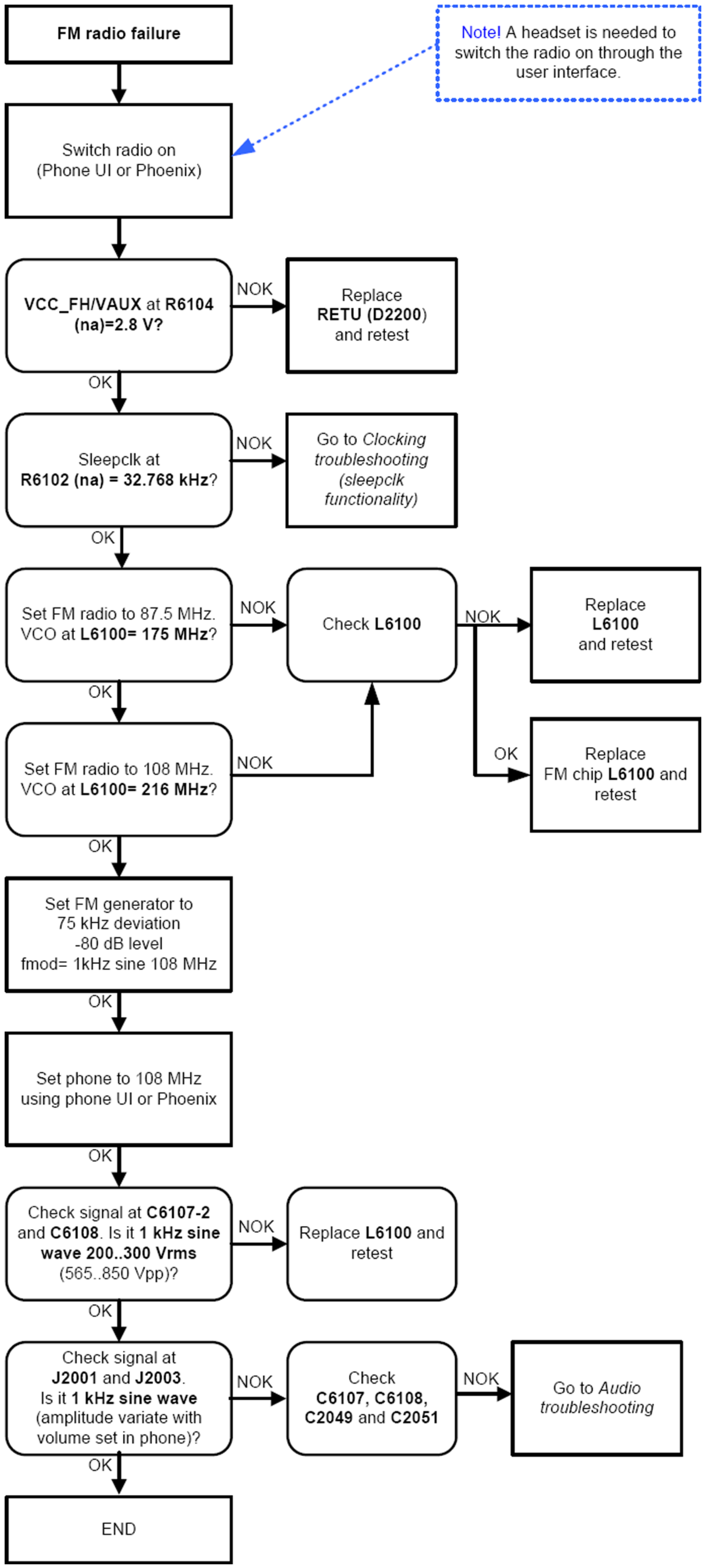

File
Control
Setup
Measure
Analyze
Utilities
Help
1:24 P
Acquisition is stopped.
2.00 GSa/s 8.20 Mpts
1.00 V/
1.00 V/
When flashing has started
BSI
PURX
More (1of 2)
Clear All
100 µs/
228.6069240 µs
1.040 V

Figure 34 Flashing pic 2. Take single trig measurement for the rise of the BSI signal.

FM radio troubleshooting

Troubleshooting flow


FM radio failure
Note! A headset is needed to switch the radio on through the user interface.
Switch radio on (Phone UI or Phoenix)
VCC_FH/VAUX at R6104 (na)=2.8 V?
NOK
Replace RETU (D2200) and retest
OK
Sleepclk at R6102 (na) = 32.768 kHz?
NOK
Go to Clocking troubleshooting (sleepclk functionality)
OK
Set FM radio to 87.5 MHz. VCO at L6100= 175 MHz?
NOK
Check L6100
NOK
Replace L6100 and retest
OK
Replace FM chip L6100 and retest
OK
Set FM radio to 108 MHz. VCO at L6100= 216 MHz?
NOK
OK
Set FM generator to 75 kHz deviation -80 dB level fmod= 1kHz sine 108 MHz
OK
Set phone to 108 MHz using phone UI or Phoenix
OK
Check signal at C6107-2 and C6108. Is it 1 kHz sine wave 200..300 Vrms (565..850 Vpp)?
NOK
Replace L6100 and retest
OK
Check signal at J2001 and J2003. Is it 1 kHz sine wave (amplitude variate with volume set in phone)?
NOK
Check C6107, C6108, C2049 and C2051
NOK
Go to Audio troubleshooting
OK
END

MicroSD card troubleshooting

Context

In the RM-217/222 the microSD card reader is located under the battery cover.

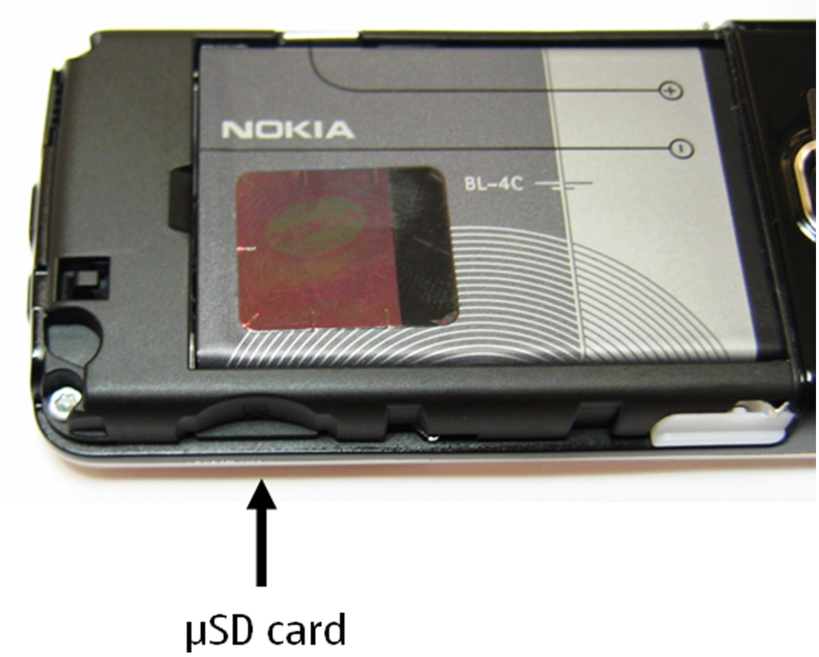
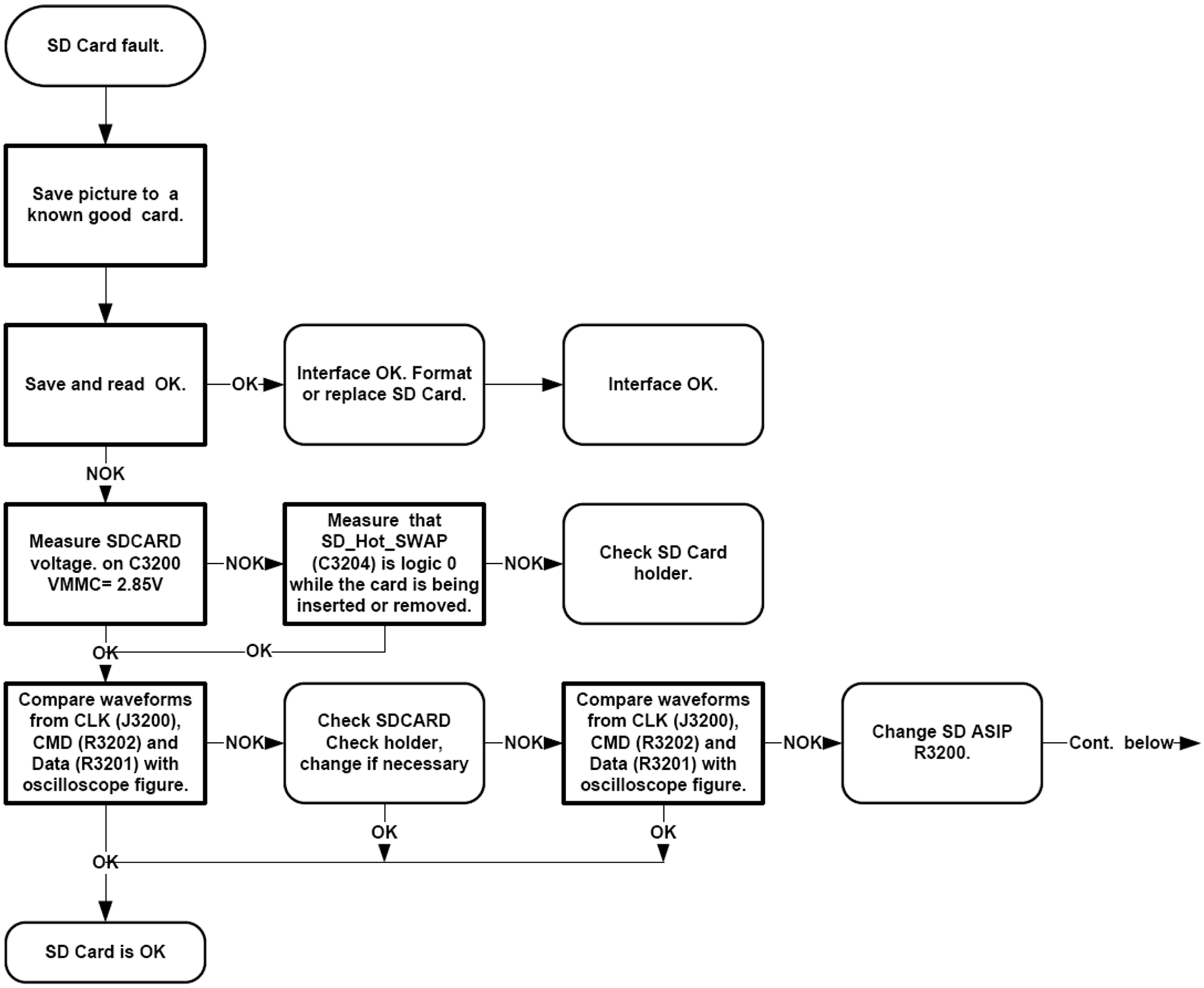
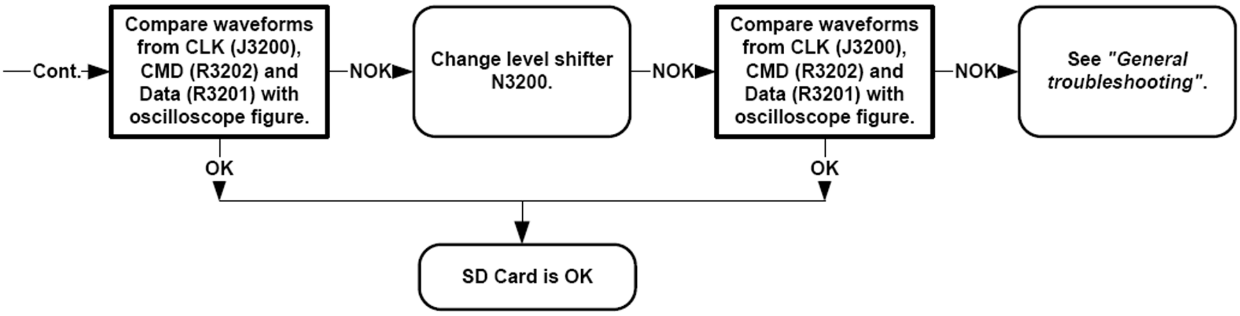
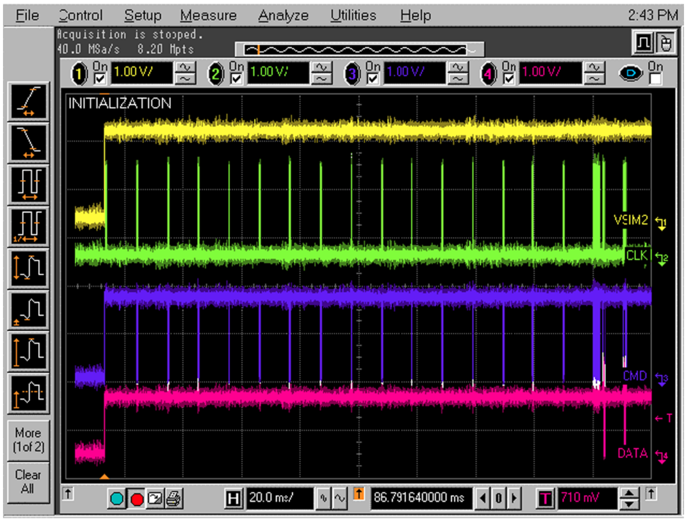


Figure 35 Location of the microSD card reader in RM-217/222

Troubleshooting flow


SD Card fault.
Save picture to a known good card.
Save and read OK.
OK
Interface OK. Format or replace SD Card.
Interface OK.
NOK
Measure SDCARD voltage. on C3200 VMMC= 2.85V
NOK
Measure that SD_Hot_SWAP (C3204) is logic 0 while the card is being inserted or removed.
NOK
Check SD Card holder.
OK
OK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Check SDCARD Check holder, change if necessary
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change SD ASIP R3200.
Cont. below
OK
OK
OK
SD Card is OK


Cont.
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
Change level shifter N3200.
NOK
Compare waveforms from CLK (J3200), CMD (R3202) and Data (R3201) with oscilloscope figure.
NOK
See "General troubleshooting".
OK
OK
SD Card is OK


File
Control
Setup
Measure
Analyze
Utilities
Help
2:43 PM
Acquisition is stopped.
40.0 MSa/s 8.20 Mpts
1.00 V/
1.00 V/
1.00 V/
1.00 V/
INITIALIZATION
VSIM2
CLK
CMD
DATA
More (1of 2)
Clear All
20.0 ms/
86.791640000 ms
710 mV

Take single trig measurement on the rising edge of the DAT signal.

Figure 36 SD card initialization from pin J3206

User interface troubleshooting

Display module troubleshooting

General instructions for display troubleshooting

Context

The RM-217/222 has three display modes:

- *Normal mode*: The display is in normal mode when the phone is in active use.
- *Partial idle mode*: The display is in partial idle mode when the power saver is on.
- *Sleep mode*: The display has a sleep mode to conserve power. In this mode the display looks blank, but the phone is switched on. To verify if the phone display is sleeping, press a key.

The operating modes of the display can be controlled with the phone settings menu.

Table 8 Display module troubleshooting cases

Display blank	There is no image on the display. The display looks the same when the phone is on as it does when the phone is off. The backlight can be on in some cases.
Image on the display not correct	Image on the display can be corrupted or a part of the image can be missing. If a part of the image is missing, change the display module. If the image is otherwise corrupted, follow the appropriate troubleshooting diagram.
Backlight dim or not working at all	Backlight LED components are inside the display module. Backlight failure can also be in the connector or in the backlight power source in the main engine of the phone. This means that in case the display is working (image OK), the backlight is faulty.

Visual defects (pixel)	Pixel defects can be checked by controlling the display with Phoenix. Use both colours, black and white, on a full screen. The display may have some random pixel defects that are acceptable for this type of display. The criteria when pixel defects are regarded as a display failure, resulting in a replacement of the display, are presented the following table.

Table 9 Pixel defects

Item		White dot defect				Black dot defect	Total
1	Defect counts	R	G	B	White Dot Total	1	1
		1	1	1	1		
2	Combined defect counts	Not allowed. Two single dot defects that are within 5 mm of each other should be interpreted as combined dot defect.					

Steps

1. Verify with a working display that the fault is not on the display module itself.

   The display module cannot be repaired.

2. Check that the cellular engine is working normally.

   i To check the functionality, connect the phone to a docking station.

   ii Start *Phoenix* service software.

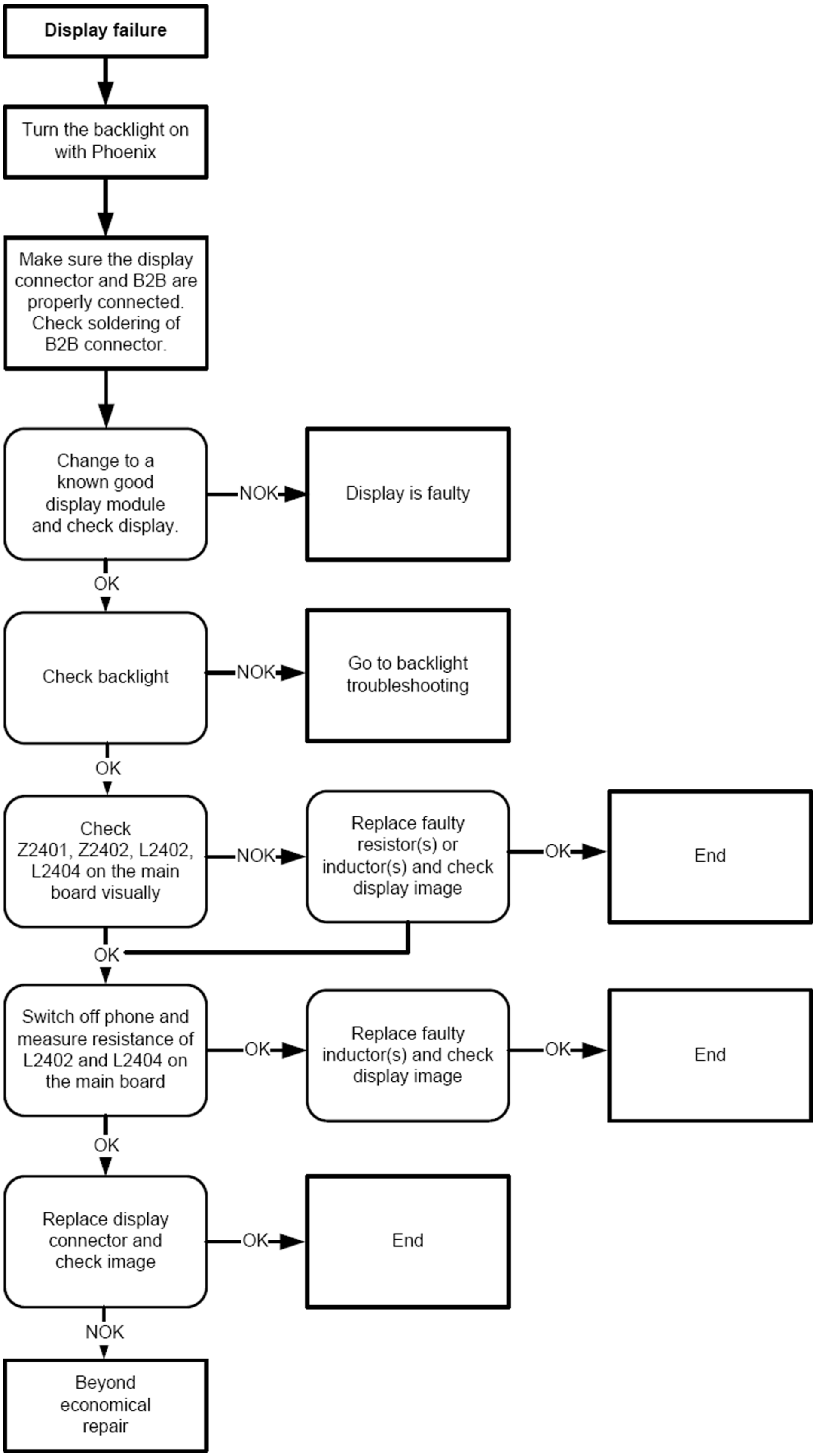
   iii Read the phone information to check that also the application engine is functioning normally (you should be able to read the APE ID).

3. Proceed to the display troubleshooting flowcharts.

   Use the **Display Test** tool in *Phoenix* to find the detailed fault mode.

Display troubleshooting

Troubleshooting flow

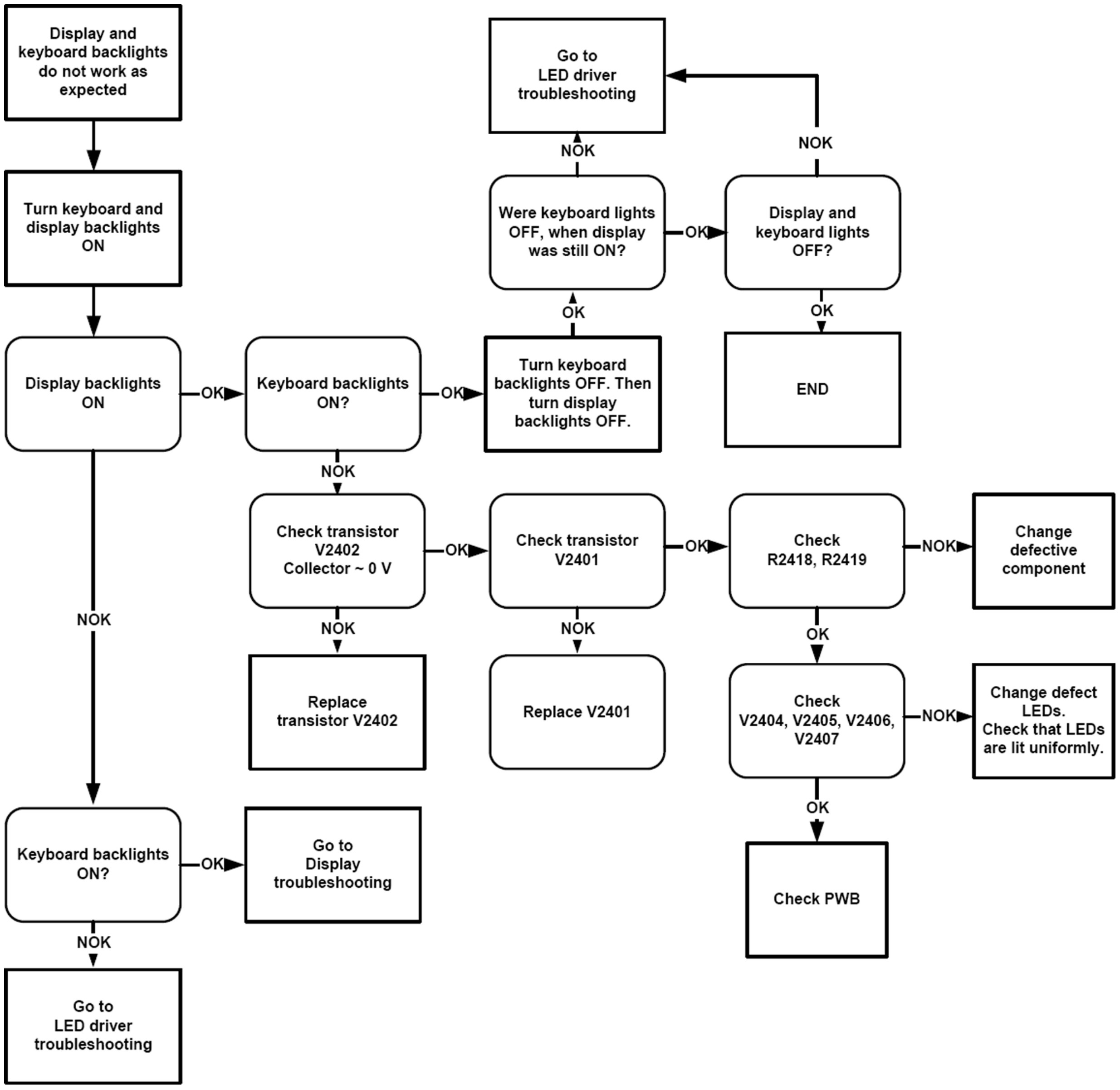

Display failure
Turn the backlight on with Phoenix
Make sure the display connector and B2B are properly connected. Check soldering of B2B connector.
Change to a known good display module and check display.
NOK
Display is faulty
OK
Check backlight
NOK
Go to backlight troubleshooting
OK
Check Z2401, Z2402, L2402, L2404 on the main board visually
NOK
Replace faulty resistor(s) or inductor(s) and check display image
OK
End
OK
Switch off phone and measure resistance of L2402 and L2404 on the main board
OK
Replace faulty inductor(s) and check display image
OK
End
OK
Replace display connector and check image
OK
End
NOK
Beyond economical repair

Backlight troubleshooting

Context

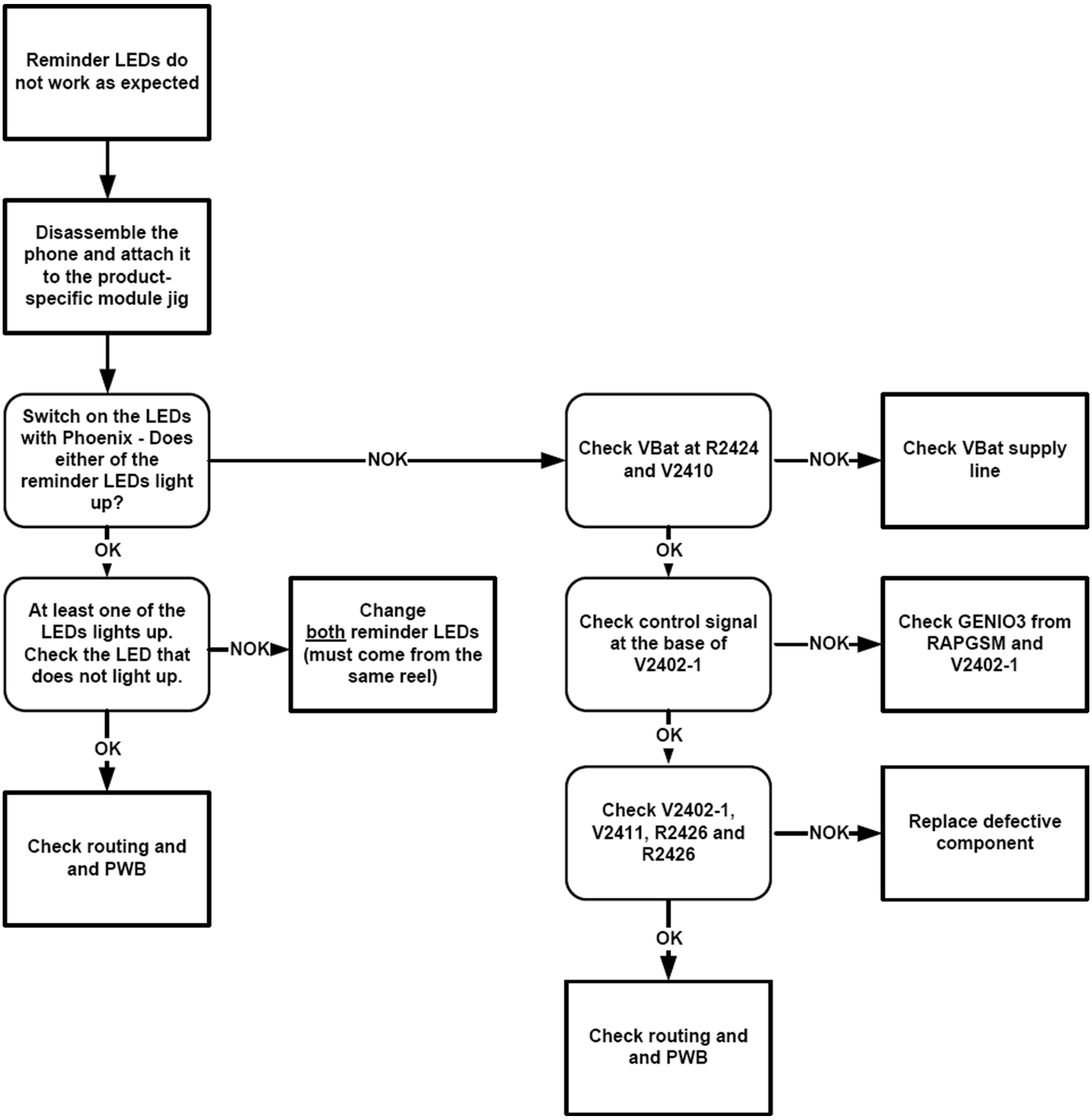
The device has one LED driver that provides current for both the display and keyboard backlights. Brightness can be adjusted manually, and it affects both the display and keypad. Keyboard backlights can be turned ON/OFF separately but not without switching on the display lights.

Display and keyboard backlight troubleshooting


Display and keyboard backlights do not work as expected
Turn keyboard and display backlights ON
Display backlights ON
OK
Keyboard backlights ON?
OK
Turn keyboard backlights OFF. Then turn display backlights OFF.
OK
Were keyboard lights OFF, when display was still ON?
NOK
Go to LED driver troubleshooting
OK
Display and keyboard lights OFF?
NOK
OK
END
NOK
Check transistor V2402 Collector ~ 0 V
OK
Check transistor V2401
OK
Check R2418, R2419
NOK
Change defective component
NOK
Replace transistor V2402
NOK
Replace V2401
OK
Check V2404, V2405, V2406, V2407
NOK
Change defect LEDs. Check that LEDs are lit uniformly.
OK
Check PWB
NOK
Keyboard backlights ON?
OK
Go to Display troubleshooting
NOK
Go to LED driver troubleshooting

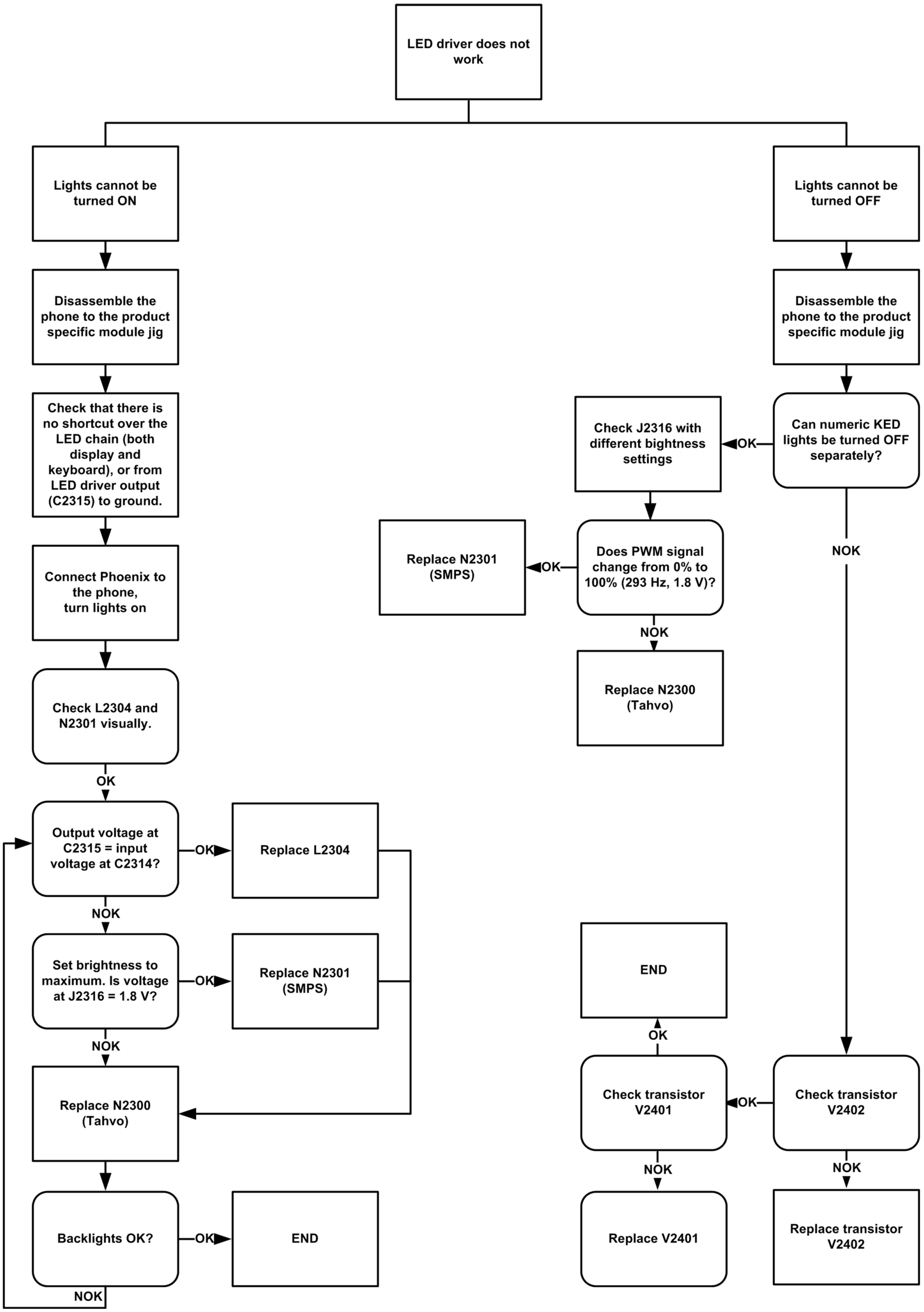
Reminder LED troubleshooting

Troubleshooting flow


Reminder LEDs do not work as expected
Disassemble the phone and attach it to the product-specific module jig
Switch on the LEDs with Phoenix - Does either of the reminder LEDs light up?
NOK
OK
Check VBat at R2424 and V2410
NOK
Check VBat supply line
OK
At least one of the LEDs lights up. Check the LED that does not light up.
NOK
Change both reminder LEDs (must come from the same reel)
OK
Check routing and and PWB
Check control signal at the base of V2402-1
NOK
Check GENIO3 from RAPGSM and V2402-1
OK
Check V2402-1, V2411, R2426 and R2426
NOK
Replace defective component
OK
Check routing and and PWB

LED driver troubleshooting

LED driver troubleshooting


LED driver does not work
Lights cannot be turned ON
Lights cannot be turned OFF
Disassemble the phone to the product specific module jig
Disassemble the phone to the product specific module jig
Check that there is no shortcut over the LED chain (both display and keyboard), or from LED driver output (C2315) to ground.
Check J2316 with different bightness settings
OK
Can numeric KED lights be turned OFF separately?
Replace N2301 (SMPS)
OK
Does PWM signal change from 0% to 100% (293 Hz, 1.8 V)?
NOK
NOK
Replace N2300 (Tahvo)
Connect Phoenix to the phone, turn lights on
Check L2304 and N2301 visually.
OK
Output voltage at C2315 = input voltage at C2314?
OK
Replace L2304
NOK
Set brightness to maximum. Is voltage at J2316 = 1.8 V?
OK
Replace N2301 (SMPS)
NOK
Replace N2300 (Tahvo)
Backlights OK?
OK
END
NOK
END
OK
Check transistor V2401
OK
Check transistor V2402
NOK
Replace V2401
NOK
Replace transistor V2402

Audio troubleshooting

Introduction to acoustics troubleshooting

Note: Always make sure all openings are clean and all contact pads are intact and make contact. If audio still does not work, please continue to the electronic audio troubleshooting (2nd diagram where applicable).

Acoustics design ensures that the sound is detected correctly with a microphone and properly radiated to the outside of the device by speaker(s). The acoustics of the phone includes three basic systems: earpiece, Integrated Hands Free (IHF) and microphone.

The sound reproduced from the earpiece readiates through a single hole on the front cover (A-cover). The sound reproduced from the IHF speaker radiates from a single sound hole located 3 cm below the power key. The microphone is located at the hinge, next to the system connector.

For a correct functionality of the phone, all sound holes must be always open. When the phone is used, care must be taken not to close any of those holes with a hand or fingers. The phone should be dry and clean, and no objects must be located in such a way that they close any of the holes.

Audio troubleshooting test instructions

Differential internal earpiece outputs can be measured either with a single-ended or a differential probe.

When measuring with a single-ended probe each output is measured against the ground.

Internal handsfree output is measured using a current probe, if a special low-pass filter designed for measuring a digital amplifier is not available. Note also that when using a current probe, the input signal frequency must be set to 2kHz.

The input signal for each loop test can be single-ended.

Required equipment

The following equipment is needed for the tests:

- Oscilloscope
- Function generator (sine waveform)
- Current probe (Internal handsfree PWM output measurement)
- Phoenix service software
- Battery voltage 3.7V

Test procedure

Audio can be tested using the Phoenix audio routings option. Three different audio loop paths can be activated:

- External microphone to Internal earpiece
- External microphone to Internal handsfree speaker
- Internal microphone to External earpiece

Each audio loop sets routing from the specified input to the specified output enabling a quick in-out test. Loop path gains are fixed and they cannot be changed using Phoenix. Correct pins and signals for each test are presented in the following table.

Phoenix audio loop tests and test results

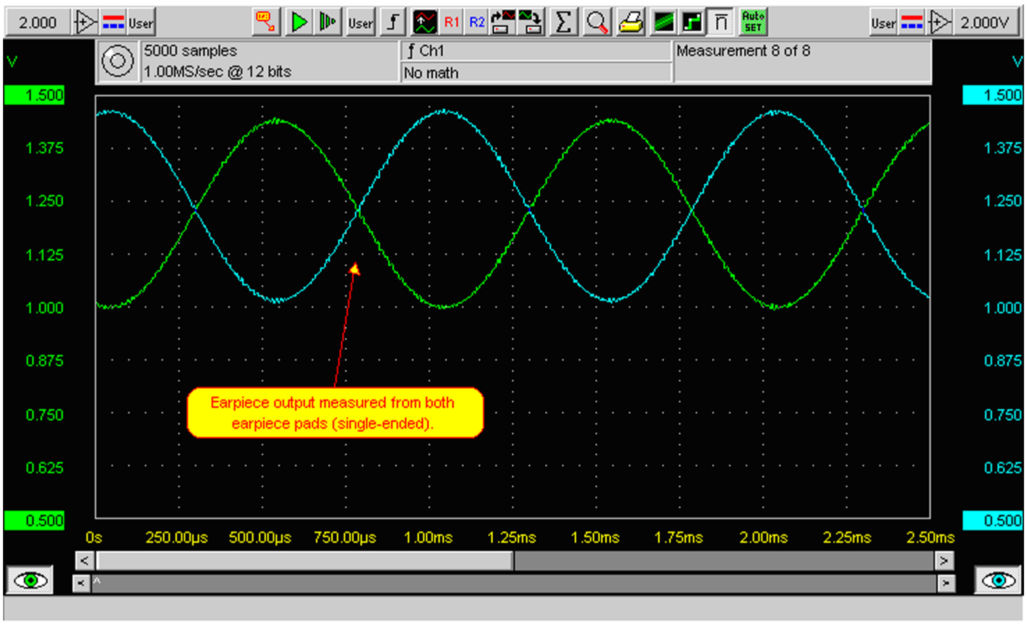
The results presented in the table apply when no accessory is connected and battery voltage is set to 3.7V.

Earpiece, internal microphone and speaker are in place during measurement. Applying a headset accessory during measurement causes a significant drop in measured quantities.

The gain values presented in the table apply for a differential output vs. single-ended/differential input.

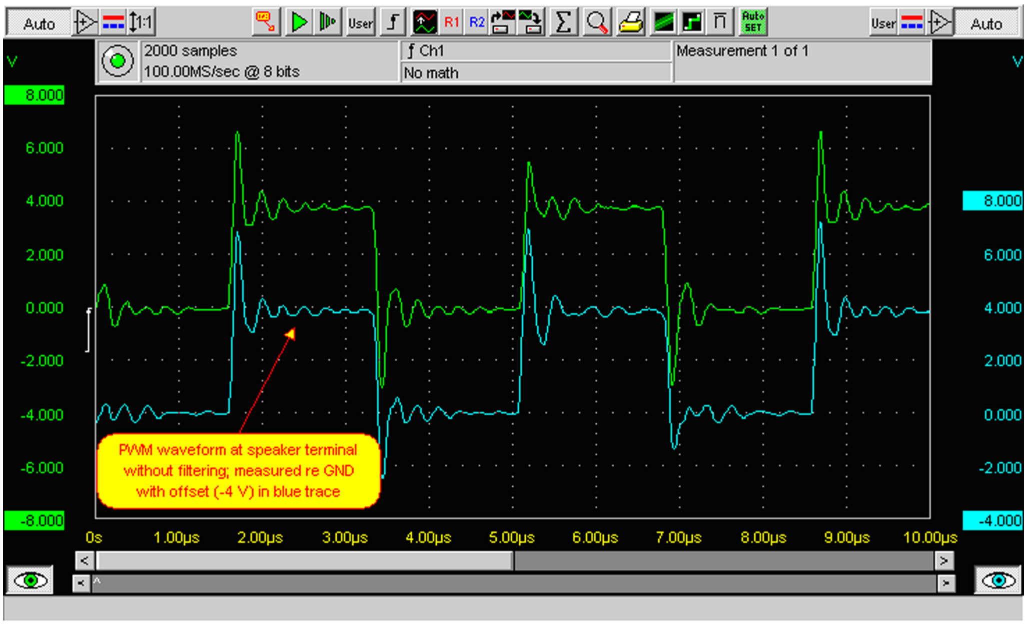
Loop test	Input terminal	Output terminal	Path gain [dB] (fixed)	Input voltage [mVp-p]	Differential output voltage [mVp-p]	Output DC level [V]	Output current [mA]
External Mic to External Earpiece	XMICP and GND	HSEAR R and GND	-2.9	1000	720	1.2	NA
		HSEAR L and GND					
External Mic to Internal Earpiece	XMICP and GND	EarP and GND	-4.0	750	490	1.2	NA
		EarN and GND					
External Mic to Internal handsfree	XMICP and GND	E2101 pad	8.5	920	2520	0	25mA (calc.)
		E2102 pad					
Internal Mic to External Earpiece	B2100 (OUT/ GND)	HSEAR R and GND	22.7	100	1360	1.2	NA
		HSEAR L and GND					

Measurement data


2.000
User
User
R1
R2
Auto SET
User
2.000V
5000 samples
1.00MS/sec @ 12 bits
ƒ Ch1
No math
Measurement 8 of 8
V
1.500
1.375
1.250
1.125
1.000
0.875
0.750
0.625
0.500
V
1.500
1.375
1.250
1.125
1.000
0.875
0.750
0.625
0.500
0s
250.00µs
500.00µs
750.00µs
1.00ms
1.25ms
1.50ms
1.75ms
2.00ms
2.25ms
2.50ms

Earpiece output measured from both earpiece pads (single-ended).

Figure 37 Single-ended output waveform of the Ext_in_HP_out measurement when earpiece is connected.



2000 samples
100.00MS/sec @ 8 bits

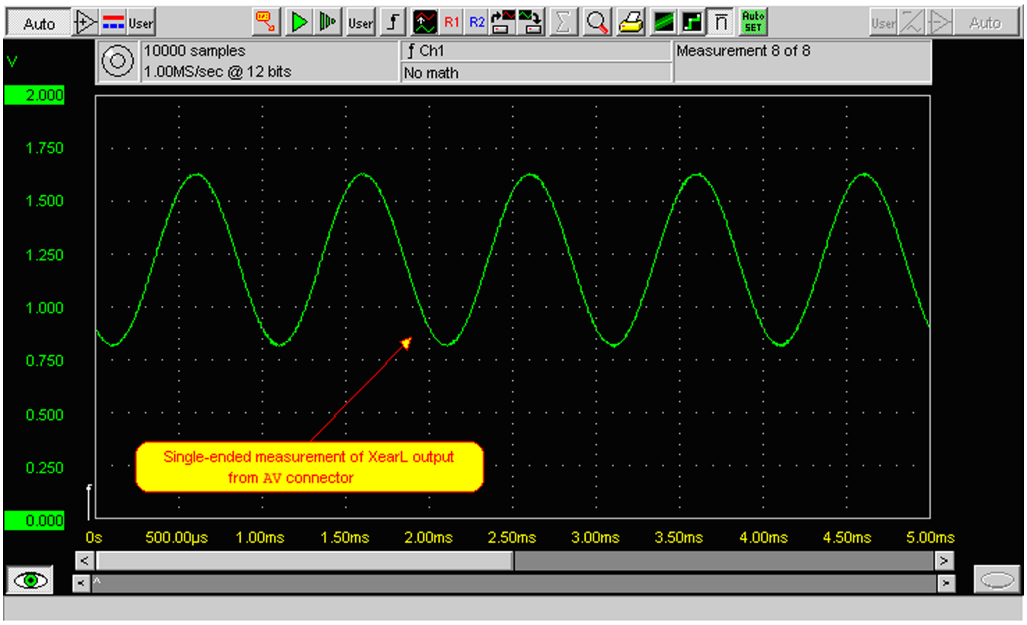
ƒ Ch1
No math

Measurement 1 of 1

PWM waveform at speaker terminal without filtering; measured re GND with offset (-4 V) in blue trace

Auto
User
Auto
V
V
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
-6.000
-8.000
8.000
6.000
4.000
2.000
0.000
-2.000
-4.000
0s
1.00µs
2.00µs
3.00µs
4.00µs
5.00µs
6.00µs
7.00µs
8.00µs
9.00µs
10.00µs

Figure 38 Differential output waveform of the Ext_in_IHF_out out loop measurement when speaker is connected.



10000 samples
1.00MS/sec @ 12 bits

ƒ Ch1
No math

Measurement 8 of 8

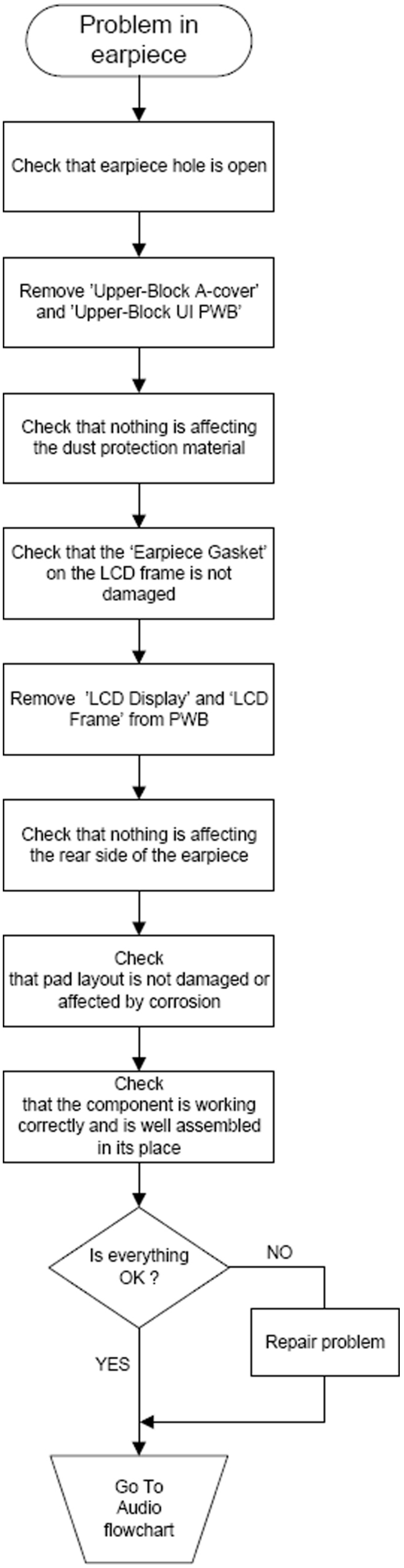
Single-ended measurement of XearL output from AV connector

Auto
User
Auto
V
2.000
1.750
1.500
1.250
1.000
0.750
0.500
0.250
0.000
0s
500.00µs
1.00ms
1.50ms
2.00ms
2.50ms
3.00ms
3.50ms
4.00ms
4.50ms
5.00ms

Figure 39 Single-ended output waveform of the HP_in_Ext_out loop when microphone is connected.

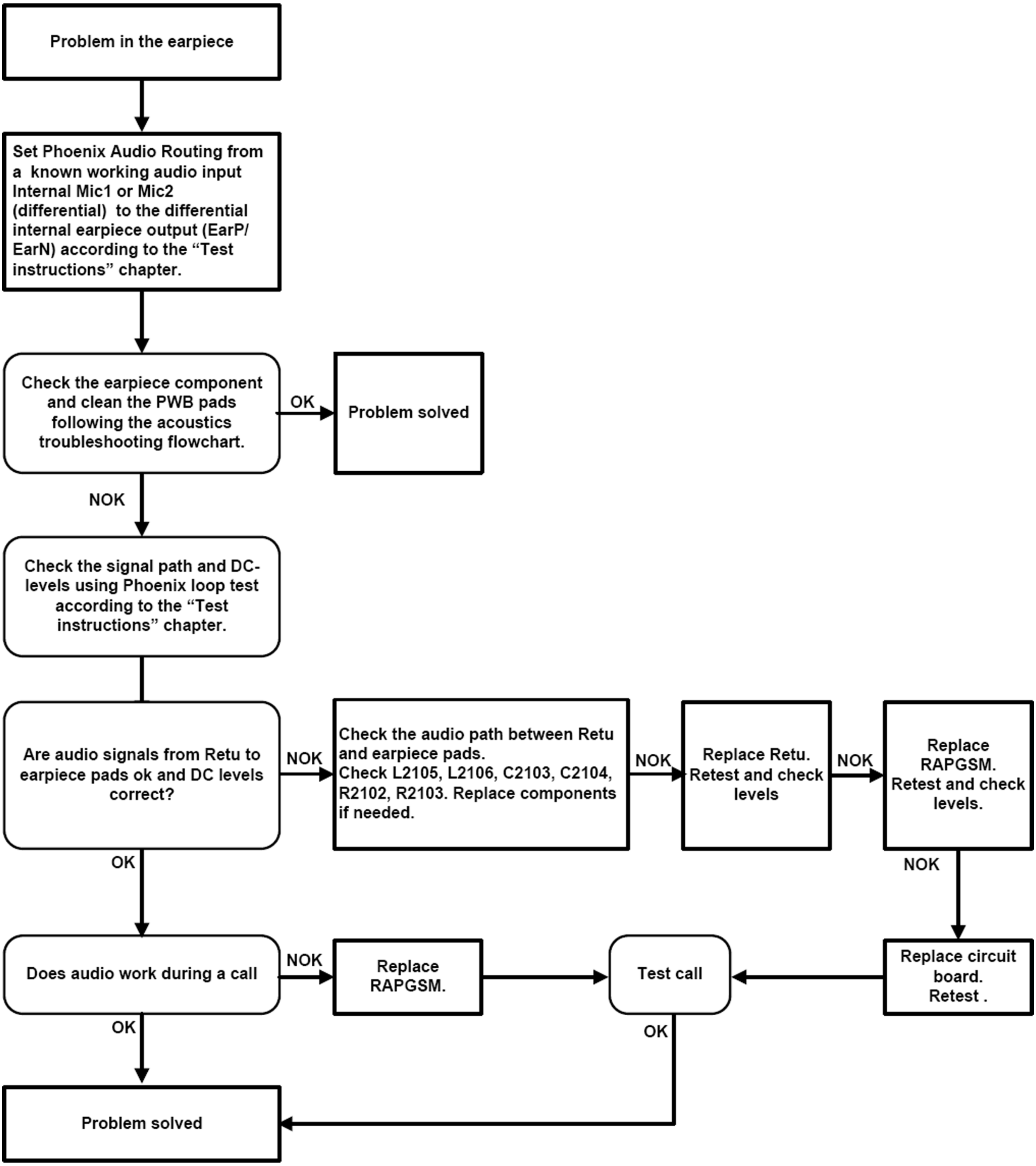
Earpiece troubleshooting

Troubleshooting flow


Problem in earpiece
Check that earpiece hole is open
Remove 'Upper-Block A-cover' and 'Upper-Block UI PWB'
Check that nothing is affecting the dust protection material
Check that the 'Earpiece Gasket' on the LCD frame is not damaged
Remove 'LCD Display' and 'LCD Frame' from PWB
Check that nothing is affecting the rear side of the earpiece
Check that pad layout is not damaged or affected by corrosion
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

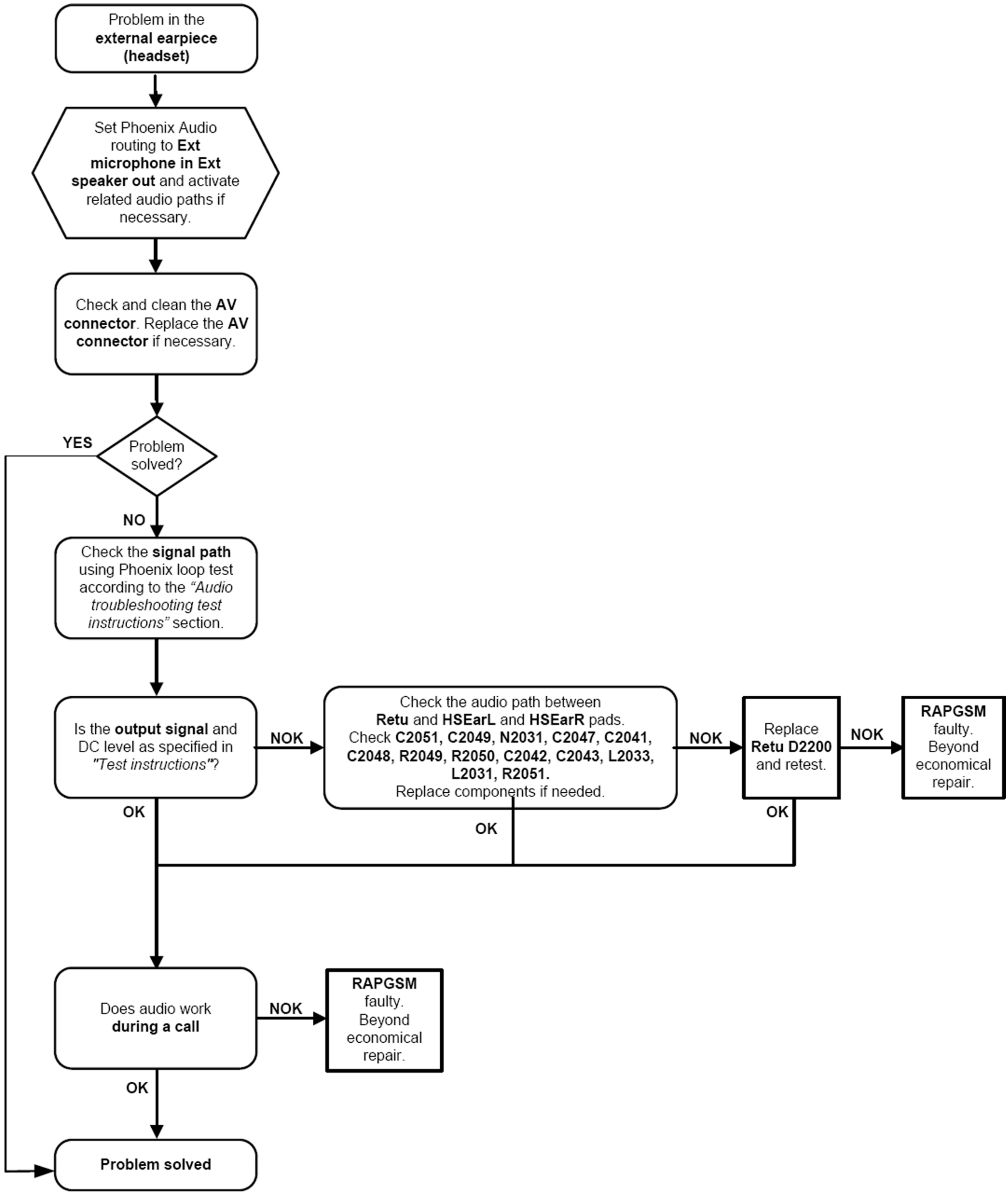
Internal earpiece troubleshooting

Troubleshooting flow


Problem in the earpiece
Set Phoenix Audio Routing from a known working audio input Internal Mic1 or Mic2 (differential) to the differential internal earpiece output (EarP/ EarN) according to the "Test instructions" chapter.
Check the earpiece component and clean the PWB pads following the acoustics troubleshooting flowchart.
OK
Problem solved
NOK
Check the signal path and DC-levels using Phoenix loop test according to the "Test instructions" chapter.
Are audio signals from Retu to earpiece pads ok and DC levels correct?
NOK
Check the audio path between Retu and earpiece pads. Check L2105, L2106, C2103, C2104, R2102, R2103. Replace components if needed.
NOK
Replace Retu. Retest and check levels
NOK
Replace RAPGSM. Retest and check levels.
NOK
OK
Does audio work during a call
NOK
Replace RAPGSM.
Test call
Replace circuit board. Retest .
OK
OK
Problem solved

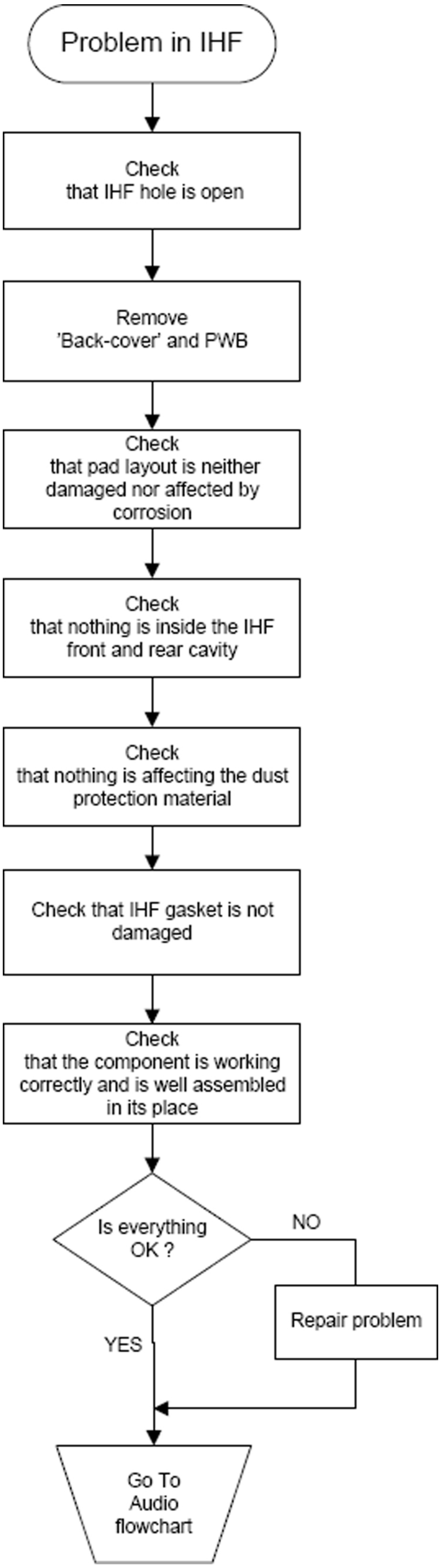
External headset earpiece troubleshooting

Troubleshooting flow


Problem in the **external earpiece (headset)**
Set Phoenix Audio routing to **Ext microphone in Ext speaker out** and activate related audio paths if necessary.
Check and clean the **AV connector**. Replace the **AV connector** if necessary.
Problem solved?
YES
NO
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and DC level as specified in *"Test instructions"*?
NOK
OK
Check the audio path between **Retu** and **HSEarL** and **HSEarR** pads. Check **C2051, C2049, N2031, C2047, C2041, C2048, R2049, R2050, C2042, C2043, L2033, L2031, R2051.** Replace components if needed.
NOK
OK
Replace **Retu D2200** and retest.
NOK
OK
RAPGSM faulty. Beyond economical repair.
Does audio work **during a call**
NOK
OK
RAPGSM faulty. Beyond economical repair.
Problem solved

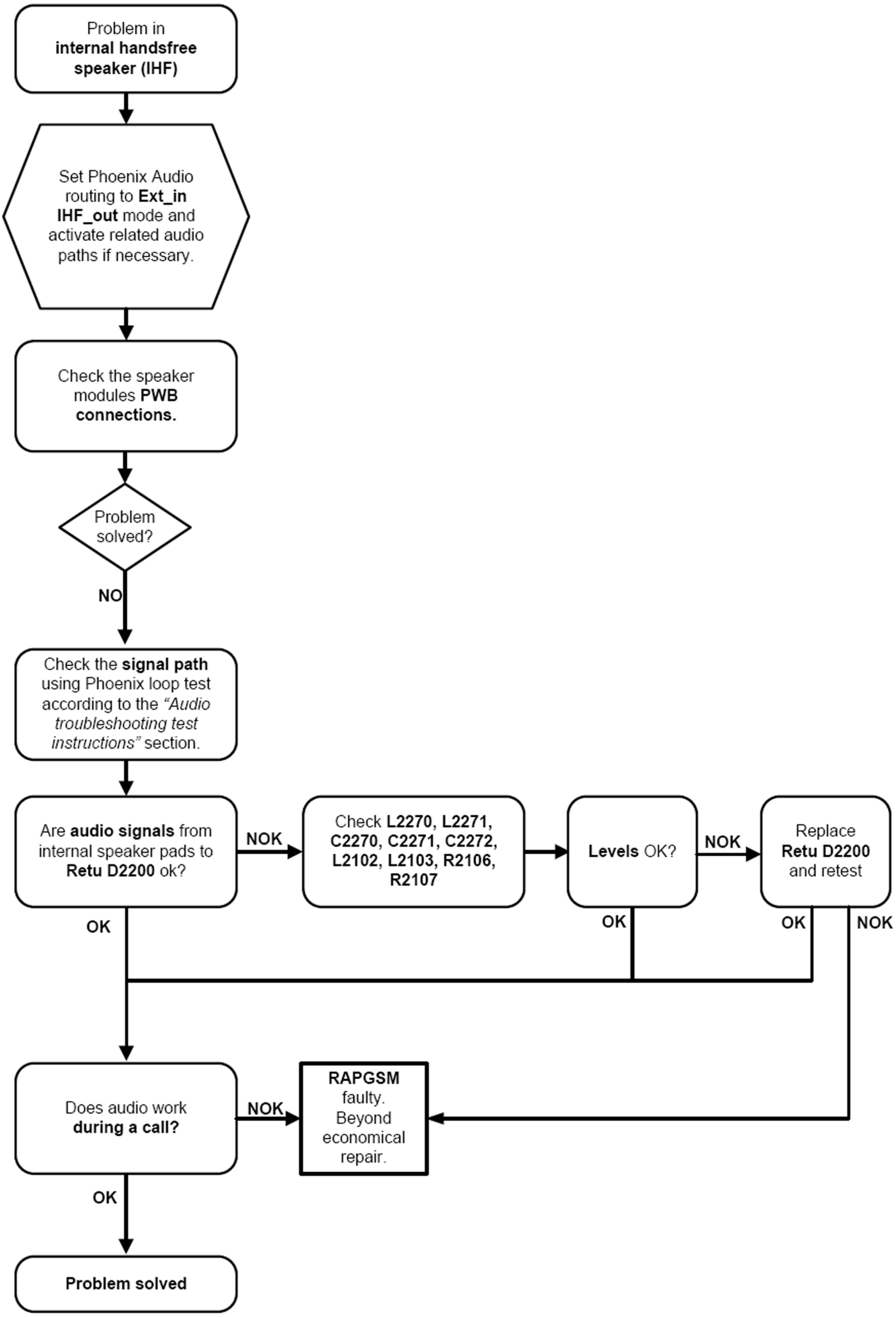
IHF troubleshooting

Troubleshooting flow


Problem in IHF
Check that IHF hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Check that nothing is inside the IHF front and rear cavity
Check that nothing is affecting the dust protection material
Check that IHF gasket is not damaged
Check that the component is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

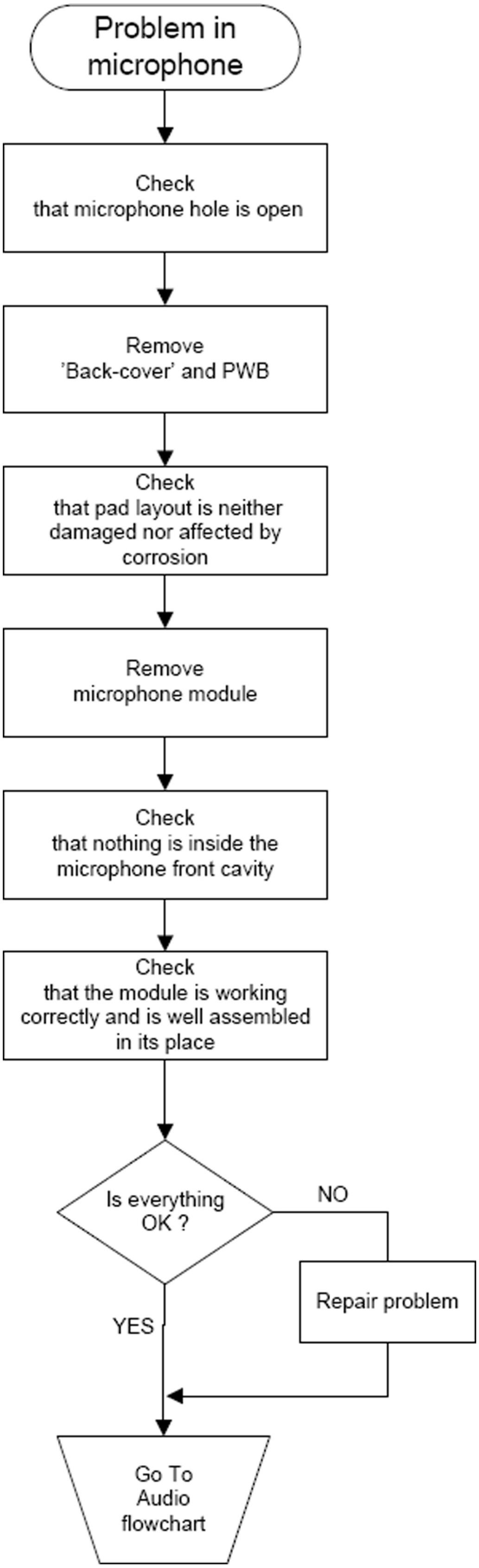
IHF troubleshooting

Troubleshooting flow


Problem in **internal handsfree speaker (IHF)**
Set Phoenix Audio routing to **Ext_in IHF_out** mode and activate related audio paths if necessary.
Check the speaker modules **PWB connections.**
Problem solved?
NO
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Are **audio signals** from internal speaker pads to **Retu D2200** ok?
NOK
Check **L2270, L2271, C2270, C2271, C2272, L2102, L2103, R2106, R2107**
Levels OK?
NOK
Replace **Retu D2200** and retest
OK
OK
OK
NOK
Does audio work **during a call?**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

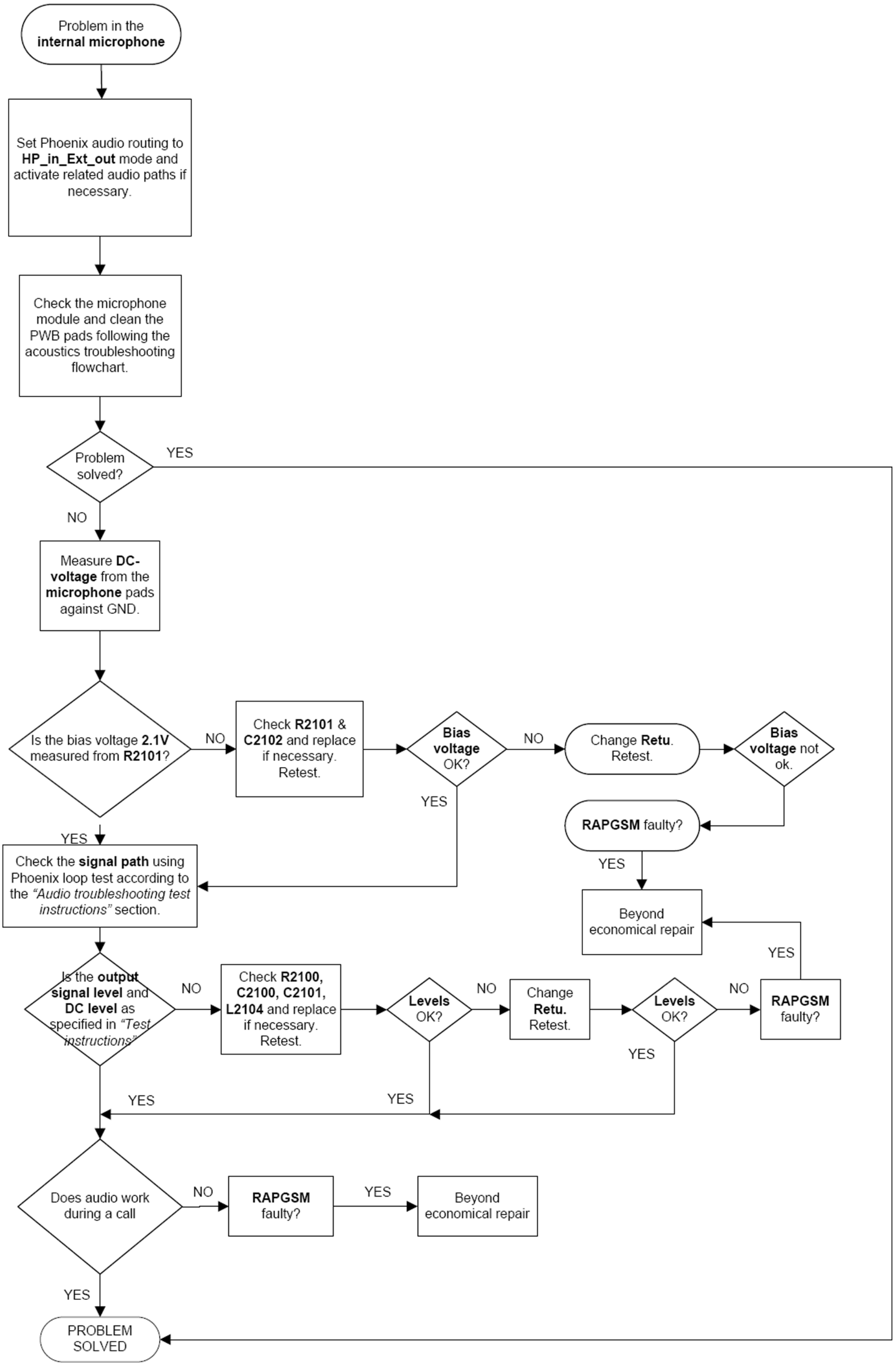
Microphone troubleshooting

Troubleshooting flow


Problem in microphone
Check that microphone hole is open
Remove 'Back-cover' and PWB
Check that pad layout is neither damaged nor affected by corrosion
Remove microphone module
Check that nothing is inside the microphone front cavity
Check that the module is working correctly and is well assembled in its place
Is everything OK ?
NO
Repair problem
YES
Go To Audio flowchart

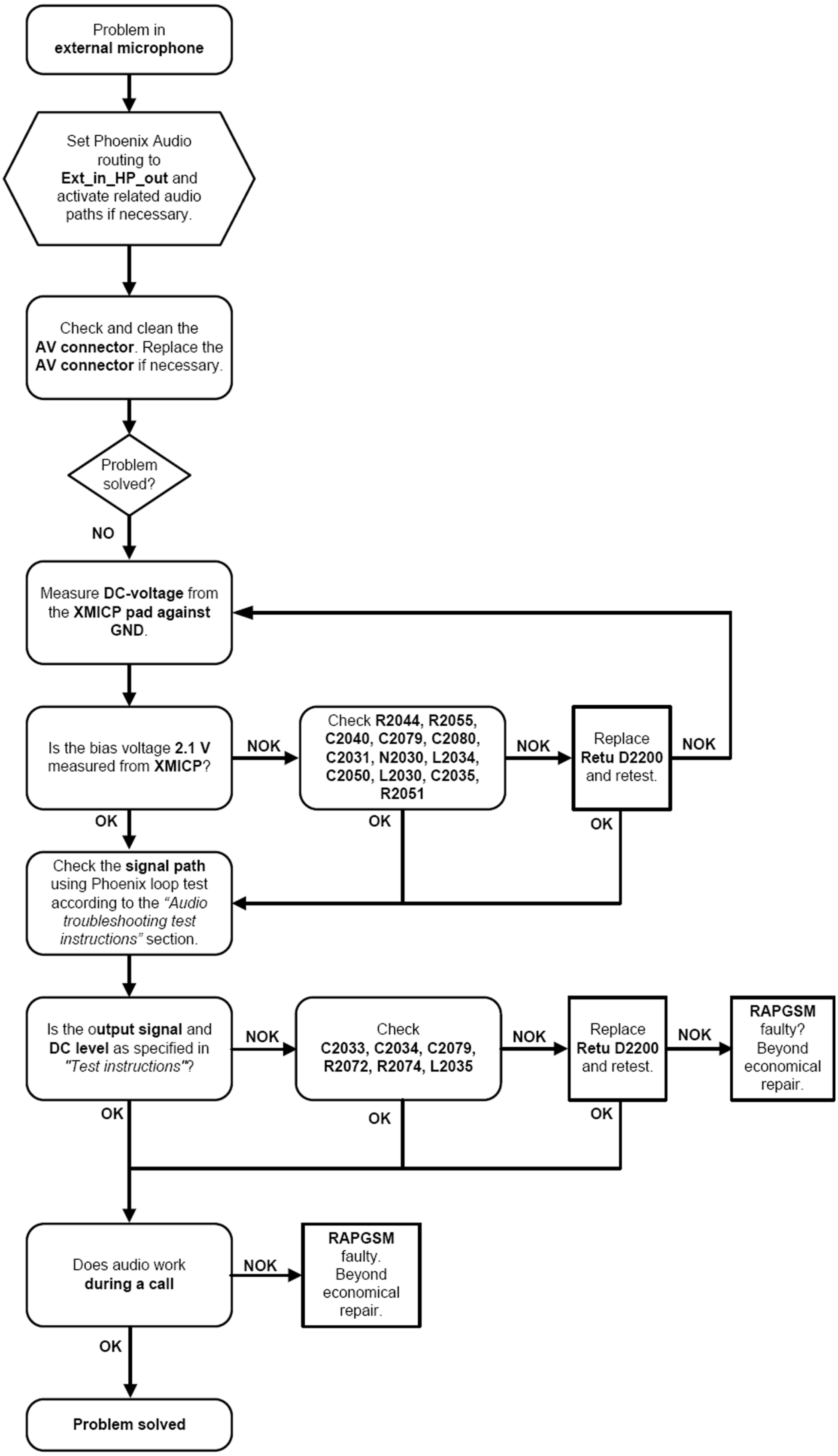
Internal microphone troubleshooting

Troubleshooting flow


Problem in the internal microphone
Set Phoenix audio routing to HP_in_Ext_out mode and activate related audio paths if necessary.
Check the microphone module and clean the PWB pads following the acoustics troubleshooting flowchart.
Problem solved?
YES
NO
Measure DC-voltage from the microphone pads against GND.
Is the bias voltage 2.1V measured from R2101?
NO
Check R2101 & C2102 and replace if necessary. Retest.
Bias voltage OK?
NO
Change Retu. Retest.
Bias voltage not ok.
YES
RAPGSM faulty?
YES
Beyond economical repair
YES
Check the signal path using Phoenix loop test according to the "Audio troubleshooting test instructions" section.
Is the output signal level and DC level as specified in "Test instructions"
NO
Check R2100, C2100, C2101, L2104 and replace if necessary. Retest.
Levels OK?
NO
Change Retu. Retest.
Levels OK?
NO
RAPGSM faulty?
YES
YES
YES
YES
Does audio work during a call
NO
RAPGSM faulty?
YES
Beyond economical repair
YES
PROBLEM SOLVED

External headset microphone troubleshooting

Troubleshooting flow


Problem in
external microphone
Set Phoenix Audio routing to **Ext_in_HP_out** and activate related audio paths if necessary.
Check and clean the **AV connector**. Replace the **AV connector** if necessary.
Problem solved?
NO
Measure **DC-voltage** from the **XMICP pad against GND**.
Is the bias voltage **2.1 V** measured from **XMICP**?
NOK
Check **R2044, R2055, C2040, C2079, C2080, C2031, N2030, L2034, C2050, L2030, C2035, R2051**
NOK
Replace **Retu D2200** and retest.
NOK
OK
OK
OK
Check the **signal path** using Phoenix loop test according to the *"Audio troubleshooting test instructions"* section.
Is the **output signal** and **DC level** as specified in *"Test instructions"*?
NOK
Check **C2033, C2034, C2079, R2072, R2074, L2035**
NOK
Replace **Retu D2200** and retest.
NOK
RAPGSM faulty? Beyond economical repair.
OK
OK
OK
Does audio work **during a call**
NOK
RAPGSM faulty. Beyond economical repair.
OK
Problem solved

Connections troubleshooting

Bluetooth troubleshooting

Introduction to Bluetooth troubleshooting

There are two main Bluetooth (BT) problems that can occur:

Problem	Description
Detachment of the BT antenna.	This would most likely happen if the device has been dropped repeatedly to the ground. It could cause the BT antenna to become loose or partially detached from the PWB.
A malfunction in the BT ASIC, BB ASICs or the phone's BT SMD components.	This is unpredictable and could have many causes i.e. SW or HW related.

The main issue is to find out if the problem is related to the BT antenna or related to the BT system or the phone's BB and then replace/fix the faulty component. For location of the antenna, please refer to the exploded view in the Parts and layouts section.

Bluetooth settings for Phoenix

Steps

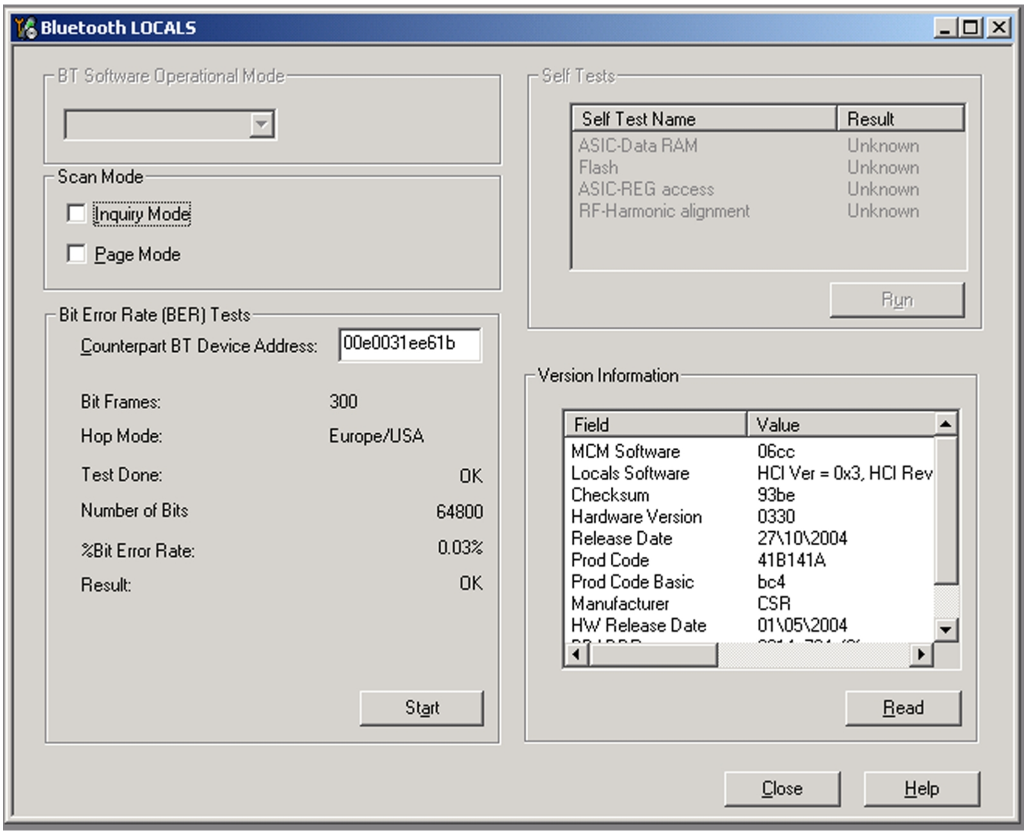
1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Place the phone to a flash adapter in the local mode.
4. Choose **Testing**→**Bluetooth LOCALS** .
5. Locate JBT-9's serial number (12 digits) found in the type label on the back of JBT-9.

   In addition to JBT-9, also SB-6, JBT-3 and JBT-6 Bluetooth test boxes can be used.
6. In the *Bluetooth LOCALS* window, write the 12-digit serial number on the **Counterpart BT Device Address** line.

   This needs to be done only once provided that JBT-9 is not changed.
7. Place the JBT-9 box near (within 10 cm) the BT antenna and click **Run BER Test**.

Results

Bit Error Rate test result is displayed in the *Bit Error Rate (BER) Tests* pane in the *Bluetooth LOCALS* window.


Bluetooth LOCALS
BT Software Operational Mode
Scan Mode
☐ Inquiry Mode
☐ Page Mode
Bit Error Rate (BER) Tests
Self Tests
Run
Version Information
Start
Read
Close
Help

Counterpart BT Device Address: 00e0031ee61b

Bit Frames: 300

Hop Mode: Europe/USA

Test Done: OK

Number of Bits 64800

%Bit Error Rate: 0.03%

Result: OK

Self Test Name	Result
ASIC-Data RAM	Unknown
Flash	Unknown
ASIC-REG access	Unknown
RF-Harmonic alignment	Unknown

Field	Value
MCM Software	06cc
Locals Software	HCI Ver = 0x3, HCI Rev
Checksum	93be
Hardware Version	0330
Release Date	27\10\2004
Prod Code	41B141A
Prod Code Basic	bc4
Manufacturer	CSR
HW Release Date	01\05\2004

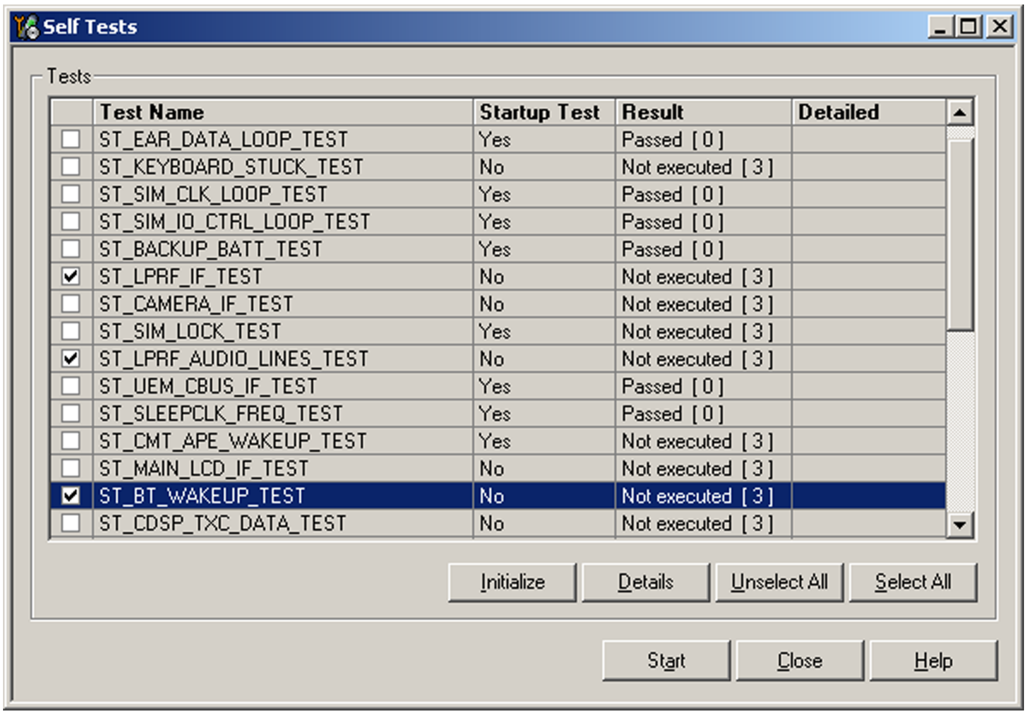
Figure 40 BER test result

Bluetooth self tests in Phoenix

Steps

1. Start *Phoenix* service software.
2. Choose**File→Scan Product.**
3. Place the phone to a flash adapter.
4. From the **Mode** drop-down menu, set mode to **Local**.
5. Choose **Testing→Self Tests.**
6. In the *Self Tests* window check the following Bluetooth related tests:
   - **ST_LPRF_IF_TEST**
   - **ST_LPRF_AUDIO_LINES_TEST**
   - **ST_BT_WAKEUP_TEST**

7. To run the tests, click **Start**.



	Test Name	Startup Test	Result	Detailed
☐	ST_EAR_DATA_LOOP_TEST	Yes	Passed [0]	
☐	ST_KEYBOARD_STUCK_TEST	No	Not executed [3]	
☐	ST_SIM_CLK_LOOP_TEST	Yes	Passed [0]	
☐	ST_SIM_IO_CTRL_LOOP_TEST	Yes	Passed [0]	
☐	ST_BACKUP_BATT_TEST	Yes	Passed [0]	
☑	ST_LPRF_IF_TEST	No	Not executed [3]	
☐	ST_CAMERA_IF_TEST	No	Not executed [3]	
☐	ST_SIM_LOCK_TEST	Yes	Not executed [3]	
☑	ST_LPRF_AUDIO_LINES_TEST	No	Not executed [3]	
☐	ST_UEM_CBUS_IF_TEST	Yes	Passed [0]	
☐	ST_SLEEPCLK_FREQ_TEST	Yes	Passed [0]	
☐	ST_CMT_APE_WAKEUP_TEST	Yes	Not executed [3]	
☐	ST_MAIN_LCD_IF_TEST	No	Not executed [3]	
☑	ST_BT_WAKEUP_TEST	No	Not executed [3]	
☐	ST_CDSP_TXC_DATA_TEST	No	Not executed [3]	

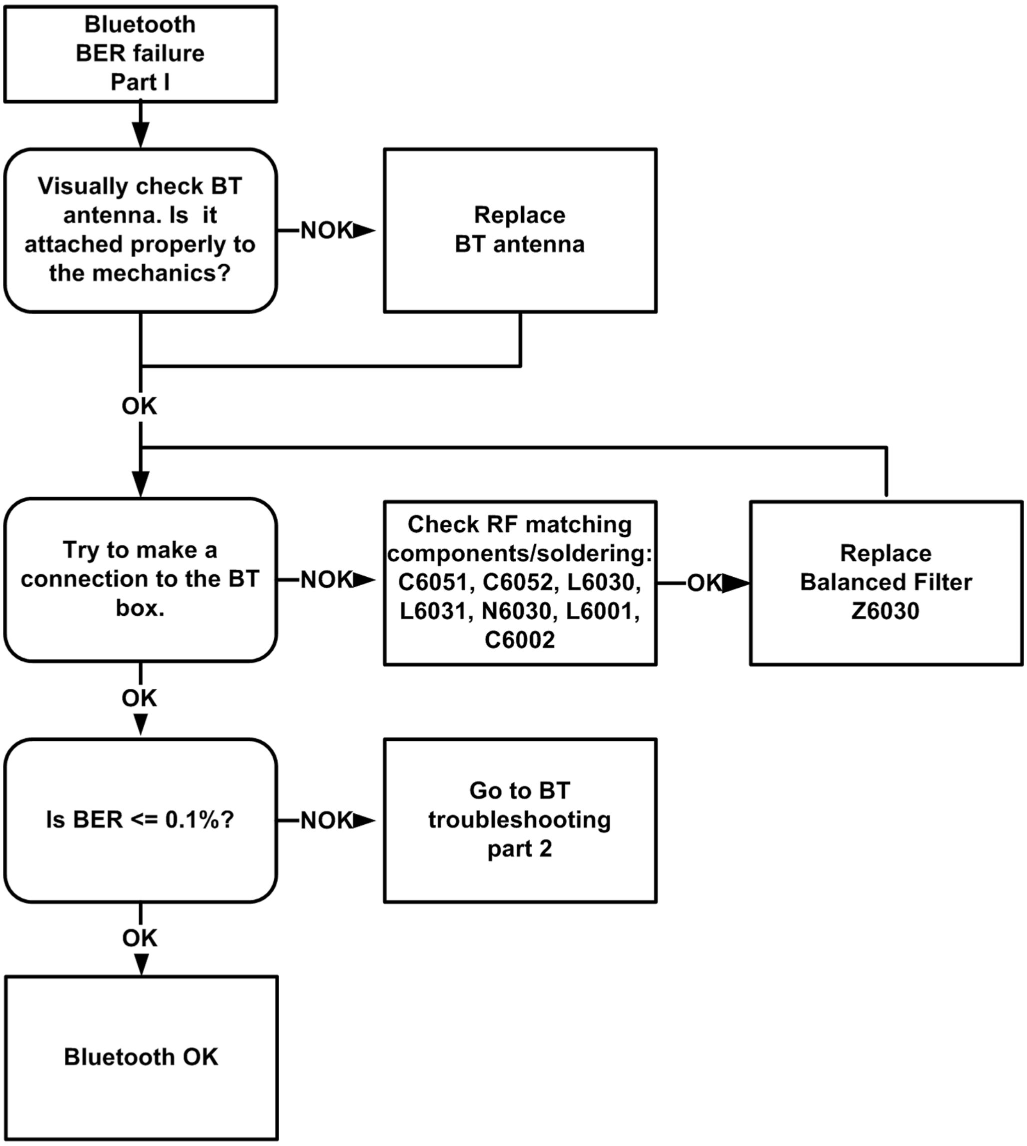
Figure 41 Bluetooth self tests in *Phoenix*

Bluetooth BER failure troubleshooting

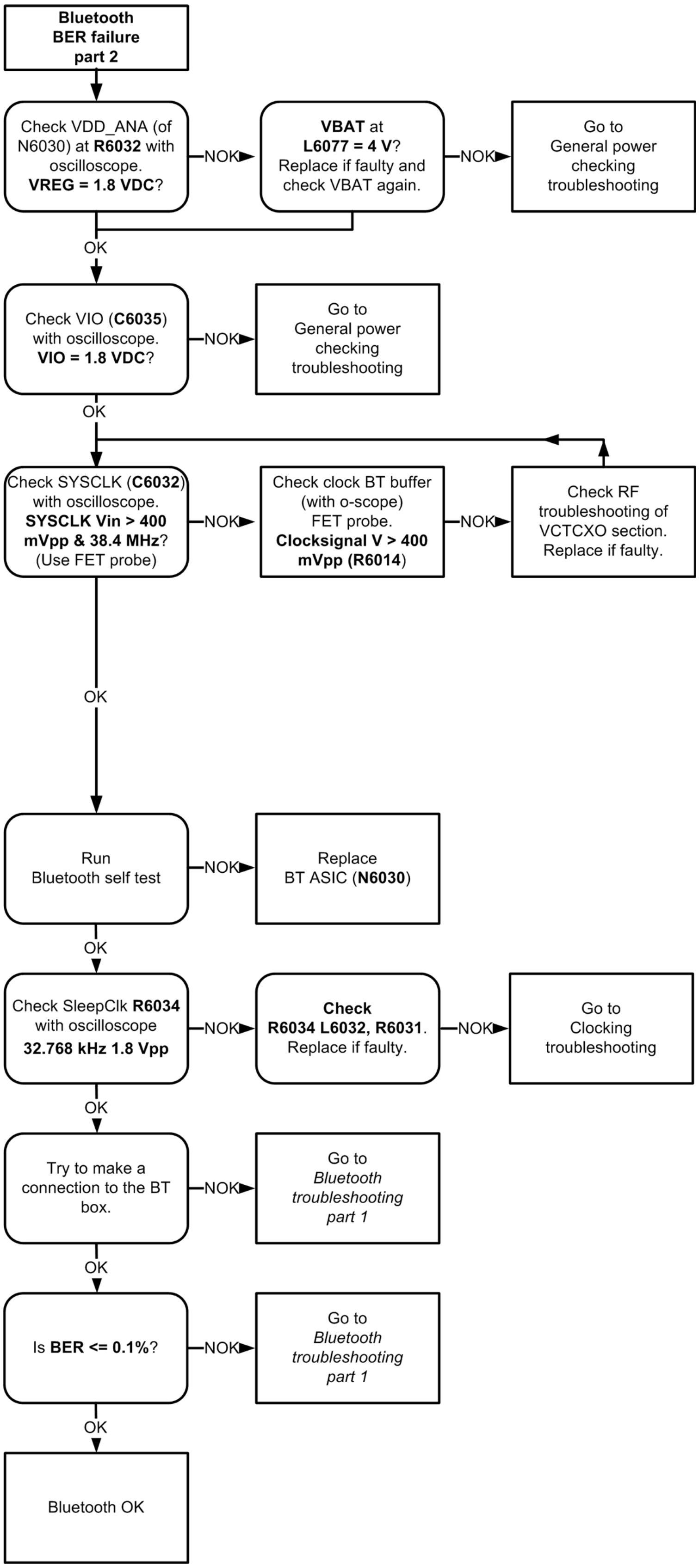
Context

Basic encoding rules, BER, is a self-identifying and self-delimiting encoding scheme, which means that each data value can be identified, extracted and decoded individually.

Part 1: Bluetooth self test passed but BER test failed

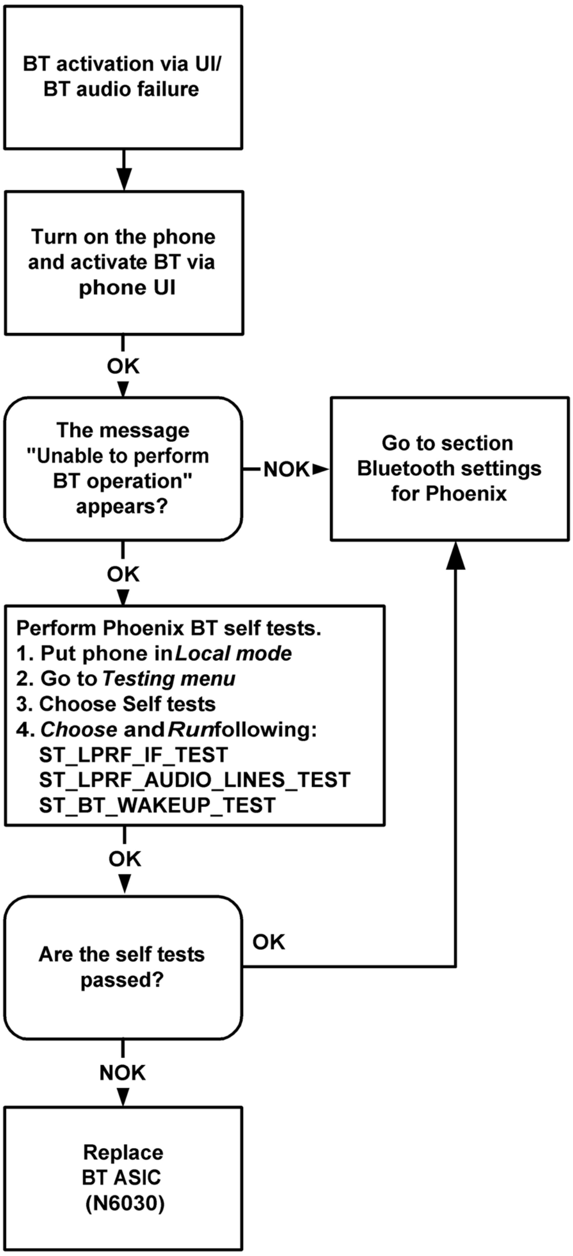

Bluetooth
BER failure
Part I
Visually check BT antenna. Is it attached properly to the mechanics?
NOK
Replace BT antenna
OK
Try to make a connection to the BT box.
NOK
Check RF matching components/soldering: C6051, C6052, L6030, L6031, N6030, L6001, C6002
OK
Replace Balanced Filter Z6030
OK
Is BER <= 0.1%?
NOK
Go to BT troubleshooting part 2
OK
Bluetooth OK

Part 2: Bluetooth self test failed


Bluetooth BER failure part 2
Check VDD_ANA (of N6030) at R6032 with oscilloscope. VREG = 1.8 VDC?
NOK
VBAT at L6077 = 4 V? Replace if faulty and check VBAT again.
NOK
Go to General power checking troubleshooting
OK
Check VIO (C6035) with oscilloscope. VIO = 1.8 VDC?
NOK
Go to General power checking troubleshooting
OK
Check SYSCLK (C6032) with oscilloscope. SYSCLK Vin > 400 mVpp & 38.4 MHz? (Use FET probe)
NOK
Check clock BT buffer (with o-scope) FET probe. Clocksignal V > 400 mVpp (R6014)
NOK
Check RF troubleshooting of VCTCXO section. Replace if faulty.
OK
Run Bluetooth self test
NOK
Replace BT ASIC (N6030)
OK
Check SleepClk R6034 with oscilloscope 32.768 kHz 1.8 Vpp
NOK
Check R6034 L6032, R6031. Replace if faulty.
NOK
Go to Clocking troubleshooting
OK
Try to make a connection to the BT box.
NOK
Go to Bluetooth troubleshooting part 1
OK
Is BER <= 0.1%?
NOK
Go to Bluetooth troubleshooting part 1
OK
Bluetooth OK

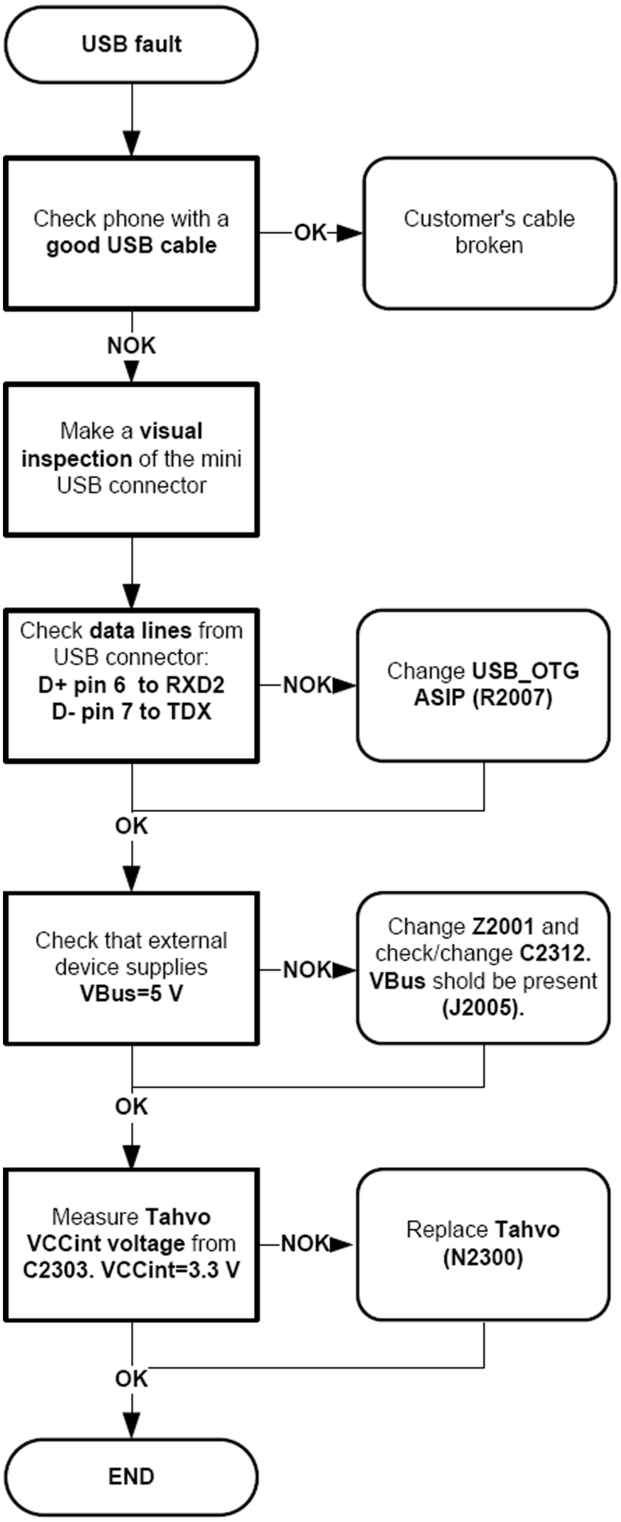
Bluetooth audio and UI activation troubleshooting

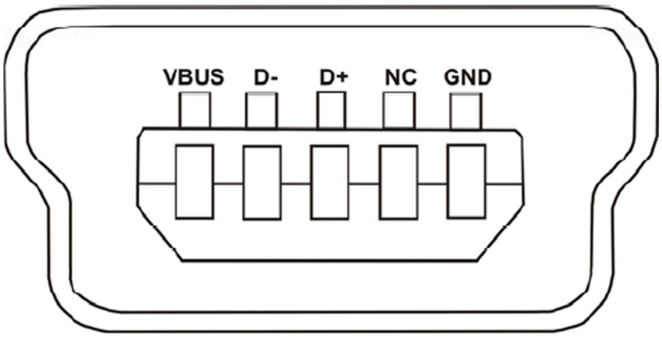
Troubleshooting flow


BT activation via UI/ BT audio failure
Turn on the phone and activate BT via phone UI
OK
The message "Unable to perform BT operation" appears?
NOK
Go to section Bluetooth settings for Phoenix
OK
Perform Phoenix BT self tests.
1. Put phone in *Local mode*
2. Go to *Testing menu*
3. Choose Self tests
4. *Choose* and *Run* following:
ST_LPRF_IF_TEST
ST_LPRF_AUDIO_LINES_TEST
ST_BT_WAKEUP_TEST
OK
Are the self tests passed?
OK
NOK
Replace BT ASIC (N6030)

USB interface troubleshooting

Troubleshooting flow


USB fault
Check phone with a good USB cable
OK
Customer's cable broken
NOK
Make a visual inspection of the mini USB connector
Check data lines from USB connector:
D+ pin 6 to RXD2
D- pin 7 to TDX
NOK
Change USB_OTG ASIP (R2007)
OK
Check that external device supplies VBus=5 V
NOK
Change Z2001 and check/change C2312. VBus shold be present (J2005).
OK
Measure Tahvo VCCint voltage from C2303. VCCint=3.3 V
NOK
Replace Tahvo (N2300)
OK
END


VBUS
D-
D+
NC
GND

Baseband manual tuning guide

Certificate restoring for BB5 products

Context

This procedure is performed when the device certificate is corrupted for some reason.

All tunings (RF & Baseband, UI) must be done after performing the certificate restoring procedure.

The procedure for certificate restoring is the following:

- Flash the phone with the latest available software using FPS-8 or FPS-10.
- Create a request file.
- Send the file to Nokia by e-mail. Use the following addresses depending on your location:
  - APAC: sydney.service@nokia.com
  - CHINA: repair.ams@nokia.com
  - E&A: salo.repair@nokia.com
  - AMERICAS: fls1.usa@nokia.com
- When you receive a reply from Nokia, carry out certificate restoring.
- Tune the phone completely.

  Note: SX-4 smart card is needed.
- If the phone resets after certificate restoring, reflash the phone again.

Required equipment and setup:

- *Phoenix* service software v 2004.39.7.70 or newer.
- The latest phone model specific *Phoenix* data package.
- PKD-1 dongle
- SX-4 smart card (Enables BB5 testing and tuning features)
- External smart card reader

  Note: The smart card reader is only needed when FPS-8 is used. FPS-10 has an integrated smart card reader.
- Activated FPS-8 flash prommer **OR** FPS-10 flash prommer
- Flash update package 03.18.004 or newer for FPS-8 or FPS-10 flash prommers
- CU-4 control unit
- USB cable from PC USB Port to CU-4 control unit
- Phone model specific adapter for CU-4 control unit
- PCS-1 cable to power CU-4 from external power supply
- XCS-4 modular cable between flash prommer and CU-4

  Note: CU-4 must be supplied with +12 V from an external power supply in all steps of certificate restoring.

Steps

1. Program the phone software.

   i Start *Phoenix* and login. Make sure the connection has been managed correctly for FPS-8 or FPS-10.

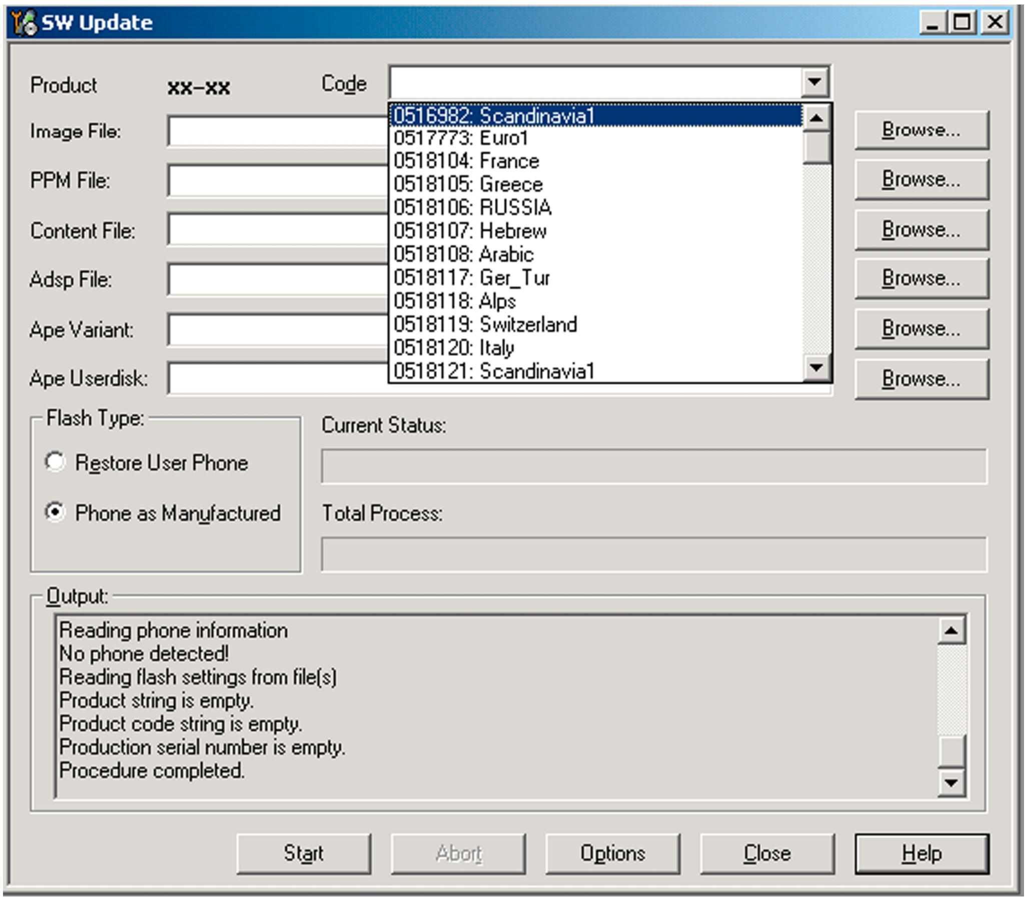
   ii Update the phone MCU software to the latest available version.

   If the new flash is empty and the phone cannot communicate with *Phoenix*, reflash the phone.

iii Choose the product manually from **File→Open Product** , and click **OK**.

Wait for the phone type designator (e.g. "RM-1") to be displayed in the status bar.

iv Go to **Flashing→SW Update** and wait until *Phoenix* reads the product data as shown in the following picture.


SW Update
Code
Image File:
PPM File:
Content File:
Adsp File:
Ape Variant:
Ape Userdisk:
0516982: Scandinavia1
0517773: Euro1
0518104: France
0518105: Greece
0518106: RUSSIA
0518107: Hebrew
0518108: Arabic
0518117: Ger_Tur
0518118: Alps
0518119: Switzerland
0518120: Italy
0518121: Scandinavia1
Browse...
Browse...
Browse...
Browse...
Browse...
Browse...
Current Status:
Total Process:
Output:
Start
Abort
Options
Close
Help

Product xx-xx

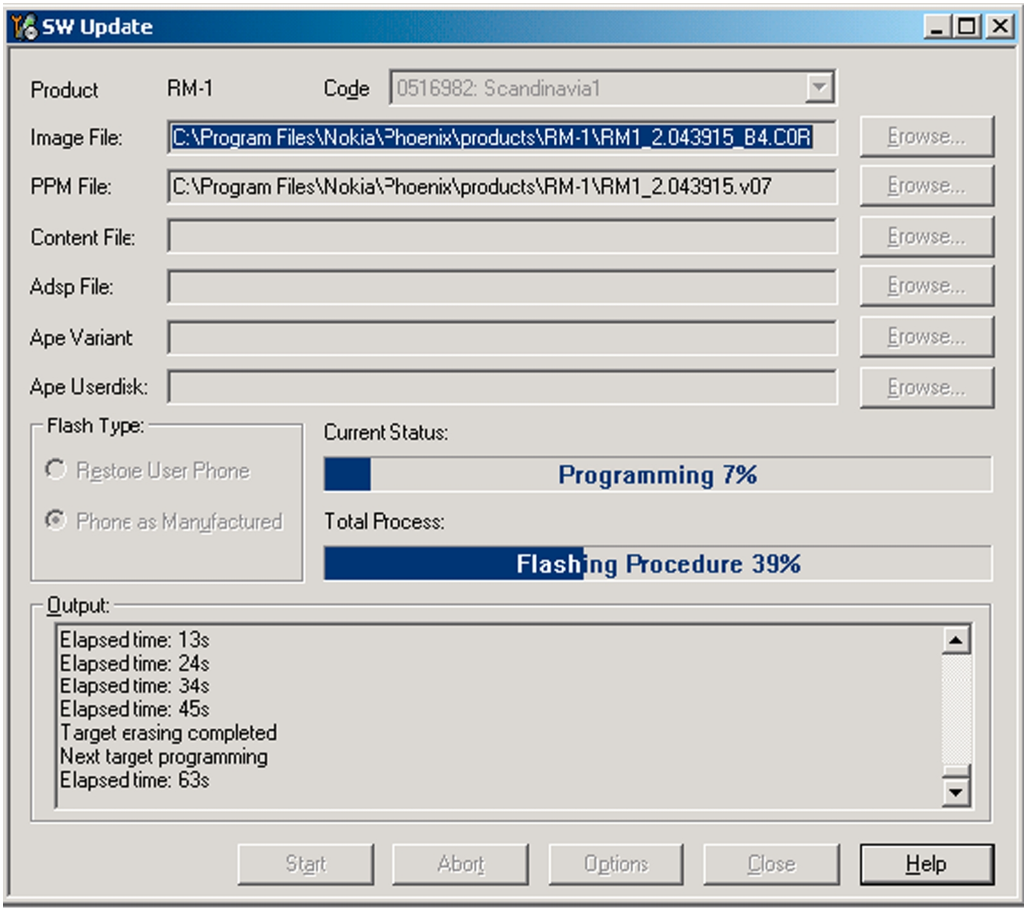
Flash Type:
○ Restore User Phone
● Phone as Manufactured

```
Reading phone information
No phone detected!
Reading flash settings from file(s)
Product string is empty.
Product code string is empty.
Production serial number is empty.
Procedure completed.
```

Product	is automatically set according to the phone support module which was opened manually, but the flash files cannot be found because the correct data cannot be read from the phone automatically.
Code	must be chosen manually, it determines the correct flash files to be used. Please choose the correct product code (can be seen in the phone type label) from the dropdown list.
Flash Type	must be set to **Phone as Manufactured**.

v To continue, click **Start**.

Progress bars and messages on the screen show actions during phone programming, please wait.


SW Update
Browse...
Flash Type:
Restore User Phone
Phone as Manufactured
Output:
Start
Abort
Options
Close
Help

Product: RM-1
Code: 0516982: Scandinavia1
Image File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915_B4.C0R
PPM File: C:\Program Files\Nokia\Phoenix\products\RM-1\RM1_2.043915.v07
Content File:
Adsp File:
Ape Variant
Ape Userdisk:
○ Restore User Phone
● Phone as Manufactured
Current Status: Programming 7%
Total Process: Flashing Procedure 39%

```
Elapsed time: 13s
Elapsed time: 24s
Elapsed time: 34s
Elapsed time: 45s
Target erasing completed
Next target programming
Elapsed time: 63s
```

Programming is completed when *Flashing Completed* message is displayed.

The product type designator and MCU SW version are displayed in the status bar.

vi Close the *SW Update* window and then choose **File→Close Product** .

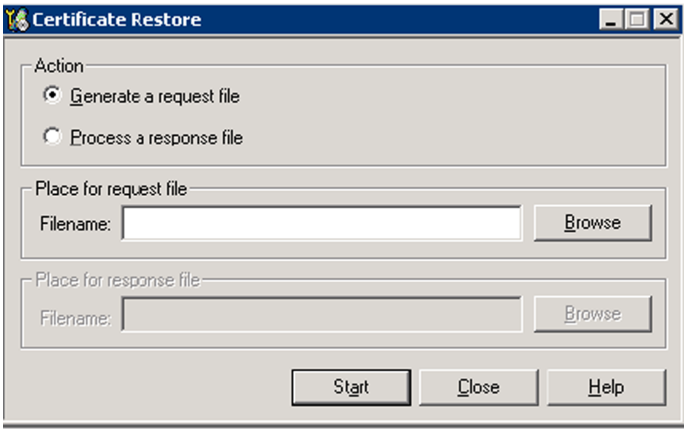
2. Create a *Request* file.

For this procedure, you must supply +12 V to CU-4 from an external power supply.

i To connect the phone with *Phoenix*, choose **File→Scan Product** .

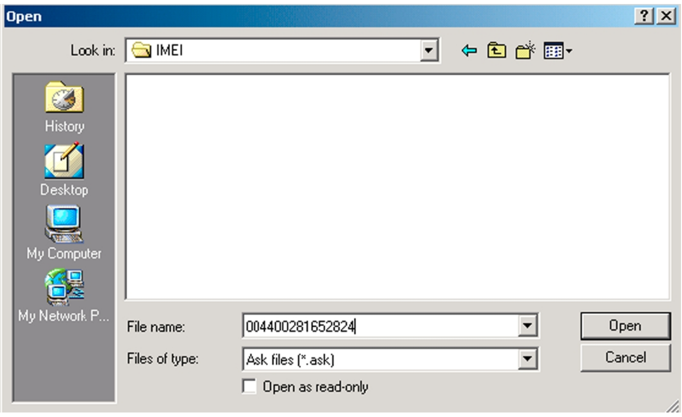
ii Choose **Tools→Certificate Restore** .

iii To choose a location for the request file, click **Browse**.


Certificate Restore
Action
Place for request file
Filename:
Browse
Place for response file
Filename:
Browse
Start
Close
Help

● Generate a request file
○ Process a response file

iv Name the file so that you can easily identify it, and click **Open**.


Open
History
Desktop
My Computer
My Network P...
Open
Cancel

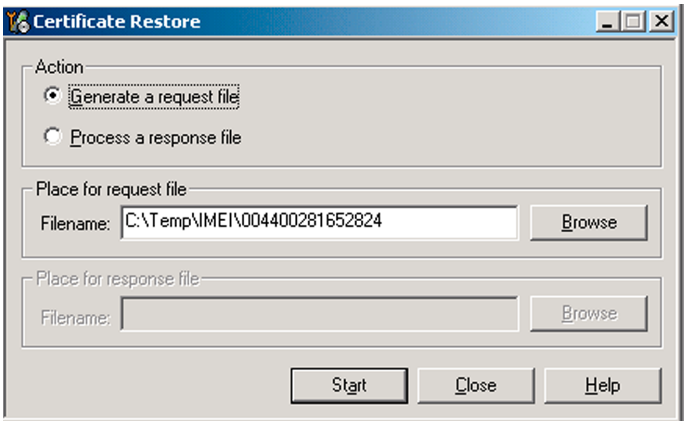
Look in: IMEI

File name: 004400281652824

Files of type: Ask files (*.ask)

☐ Open as read-only

The name of the file and its location are shown.


Certificate Restore
Browse
Browse
Start
Close
Help

Action

● Generate a request file

○ Process a response file

Place for request file

Filename: C:\Temp\IMEI\004400281652824

Place for response file

Filename:

v To create the *Request* file, click **Start**.

vi When the file for certificate restore has been created, send it to Nokia as an e-mail attachment.

3. Restore certificate.

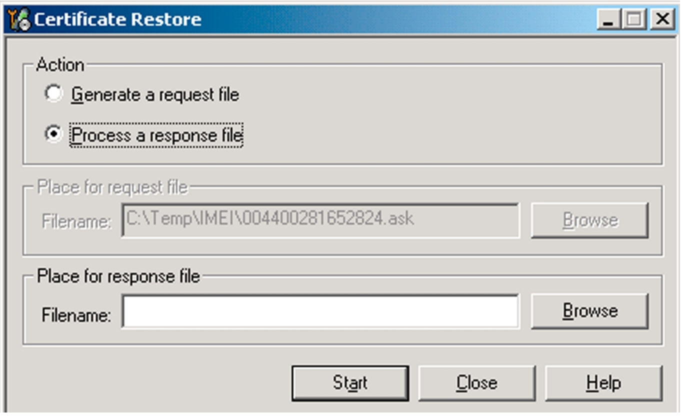
For this procedure, you must supply +12 V to CU-4 from an external power supply.

i Save the reply file sent by Nokia to your computer.

ii Start *Phoenix* service software.

iii Choose **File→Scan Product** .

iv From the **Tools** menu, choose **Certificate Restore** and select **Process a response file** in the *Action* pane.


Certificate Restore
Action
Generate a request file
Place for request file
Browse
Place for response file
Browse
Start
Close
Help

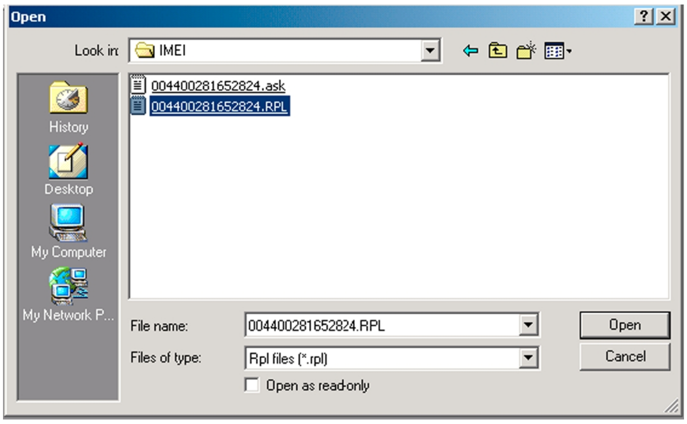
○ Generate a request file
● Process a response file

Place for request file — Filename: C:\Temp\IMEI\004400281652824.ask

Place for response file — Filename:

v To choose the location where response file is saved, click **Browse**.

vi Click **Open**.


Open
Look in:
History
Desktop
My Computer
My Network P...
004400281652824.ask
004400281652824.RPL
Open
Cancel

Look in: IMEI

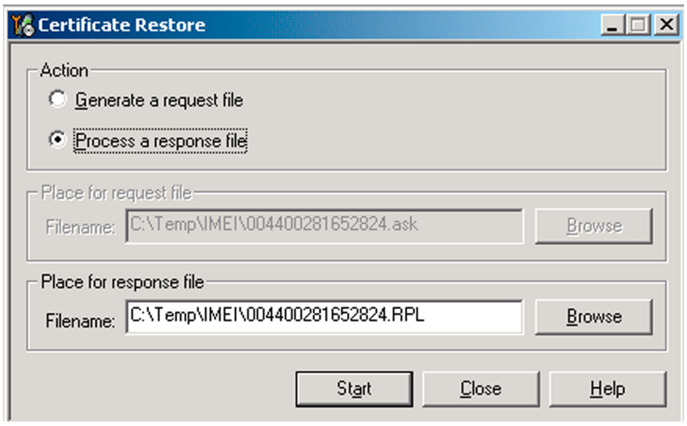
File name: 004400281652824.RPL

Files of type: Rpl files (*.rpl)

☐ Open as read-only

The name of the file and the path where it is located are shown.

vii To write the file to phone, click **Start**.


Certificate Restore
Action
Place for request file
Browse
Place for response file
Browse
Start
Close
Help

○ Generate a request file
● Process a response file

Place for request file — Filename: C:\Temp\IMEI\004400281652824.ask

Place for response file — Filename: C:\Temp\IMEI\004400281652824.RPL

Next actions

After a successful rewrite, you must retune the phone completely by using *Phoenix* tuning functions.

Important: Perform all tunings: RF, BB, and UI.

Energy management calibration

Prerequisites

Energy Management (EM) calibration is performed to calibrate the setting (gain and offset) of AD converters in several channels (that is, **battery voltage**, **BSI**, **battery current**) to get an accurate AD conversion result.

Hardware setup:

- An external power supply is needed.
- Supply 12V DC from an external power supply to CU-4 to power up the phone.
- The phone must be connected to a CU-4 control unit with a product-specific flash adapter.

Steps

1. Place the phone to the docking station adapter (CU-4 is connected to the adapter).
2. Start *Phoenix* service software.
3. Choose **File**→ **Scan Product.**
4. Choose **Tuning**→**Energy Management Calibration.**
5. To show the current values in the phone memory, click **Read**, and check that communication between the phone and CU-4 works.
6. Check that the **CU-4 used** check box is checked.
7. Select the item(s) to be calibrated.

   Note: ADC calibration has to be performed before other item(s). However, if all calibrations are selected at the same time, there is no need to perform the ADC calibration first.

8. Click **Calibrate**.

   The calibration of the selected item(s) is carried out automatically.

   The candidates for the new calibration values are shown in the *Calculated values* column. If the new calibration values seem to be acceptable (please refer to the following "Calibration value limits" table), click **Write** to store the new calibration values to the phone permanent memory.

Table 10 Calibration value limits

Parameter	Min.	Max.
ADC Offset	-20	20
ADC Gain	12000	14000
BSI Gain	1100	1300
VBAT Offset	2400	2650
VBAT Gain	19000	23000
VCHAR Gain	N/A	N/A
IBAT (ICal) Gain	7750	12250

9. Click **Read**, and confirm that the new calibration values are stored in the phone memory correctly. If the values are not stored to the phone memory, click **Write** and/or repeat the procedure again.
10. To end the procedure, close the *Energy Management Calibration* window.

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7 — RF Troubleshooting and Manual Tuning Guide

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Introduction to RF troubleshooting

On the following pages you will find a step-by-step troubleshooting procedure and reference measurements at the relevant signal points. For functional descriptions, please refer to the System module section.

Notes on reference measurements

All measurements must be done using:

- spectrum analyser with a high-frequency high-impedance passive probe (LO-/reference frequencies and RF power levels)
- oscilloscope with a 10:1 probe (DC-voltages and low frequency signals)

Important: All measurements with an RF coupler must be performed in an RF shielded environment, or where there are no transmissions on the same frequencies. This may disturb sensitive receiver measurements.

Repairing this phone - important

The RF section of the phone is built around one RF ASIC. Before changing the RF ASIC, please make sure that supply voltages and serial communication coming from baseband to RF are OK.

Please note that the grounding of the FEM module is directly below the FEM module. Therefore, it is difficult to check or change the module.

Most RF semiconductors are static discharge sensitive! ESD protection must be taken care of during repair (ground straps and ESD soldering irons). The RF ASIC and FEM are moisture sensitive, so parts must be pre-baked prior to soldering.

In addition to key components, there are lot of discrete components (resistors, inductors and capacitors) which troubleshooting is done mainly by checking if the soldering of the component is done properly.

Capacitor can be checked for shorts and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

Keep in mind that all measured voltages or RF levels depicted in the service manual are rough figures. Especially RF levels vary because of different measuring equipment or different grounding of the probe used.

When using an RF probe, use a pair of metallic tweezers to connect the probe ground to the PWB ground as close to the measurement point as possible. If measurements are performed in a product specific module jig, then “GND” pads should be used for the probe ground.

Supported bands

The following part of the service manual contains a description of all four GSM bands. It covers both variants, RM-217 and RM-222. Both variants support three GSM bands as follows:

- **RM-217**: GSM900, GSM1800, GSM1900
- **RM-222**: GSM850, GSM1800, GSM1900

Make sure to investigate only the bands, which the phone is made for.

RF key components

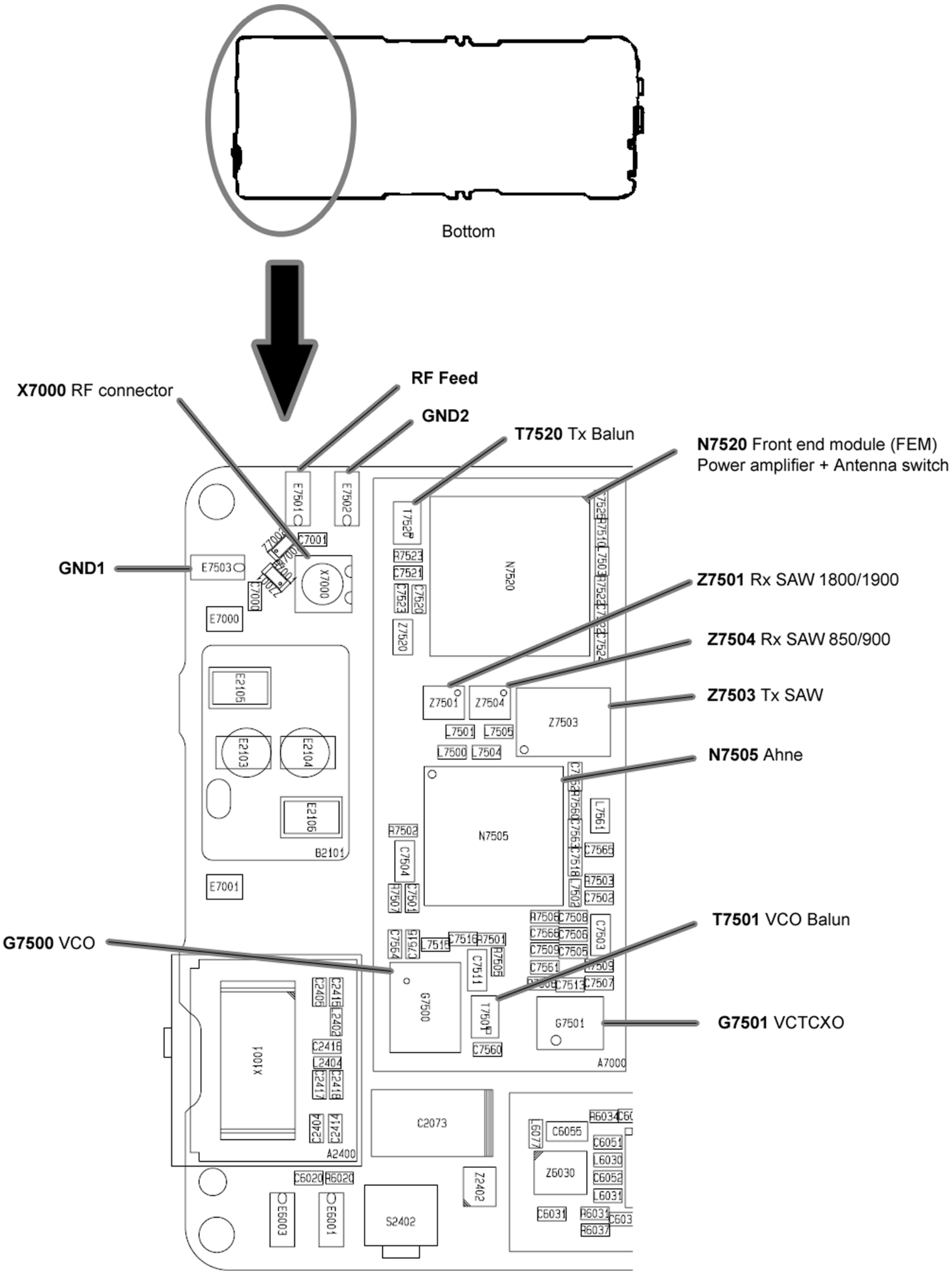

Bottom
X7000 RF connector
RF Feed
GND2
T7520 Tx Balun
N7520 Front end module (FEM)
Power amplifier + Antenna switch
GND1
Z7501 Rx SAW 1800/1900
Z7504 Rx SAW 850/900
Z7503 Tx SAW
N7505 Ahne
T7501 VCO Balun
G7500 VCO
G7501 VCTCXO
E7501
E7502
C7001
X7000
E7503
E7000
N7520
Z7501
Z7504
Z7503
N7505
E2105
E2103
E2104
E2106
B2101
E7001
G7500
T7501
G7501
A7000
X1001
A2400
C2073
Z6030
S2402
Z2402
E6003
E6001

Figure 42 RF key components, bottom side main board

Receiver troubleshooting

Introduction to RX troubleshooting

Rx can be tested by making a phone call or in the local mode. For the local mode testing, use Phoenix service software.

The main Rx troubleshooting measurement is RSSI measurement. This test measures the signal strength of the received signal. I and Q branches can be measured separately.

In GSM, the input signal can be either a real GSM signal or a CW signal that is 67.771kHz up from the carrier frequency.

For service tool usage instructions, refer to section Service Tools and Service Concepts.

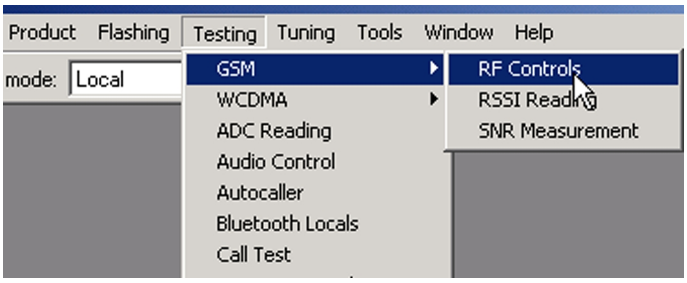
General instructions for RX troubleshooting

Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-122) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise the RF part may be damaged.

   Note: Make sure that all connections are made to the correct RF connector.
4. Set Rx on.
   - i Set the phone module to the test jig and start *Phoenix service software*.
   - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS).
   - iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone, eg. RM-217/222), or press **Ctrl + R** to scan product.
   - iv From the toolbar, set operating mode to “Local”.
5. EGSM850/900/1800/1900 troubleshooting
   - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .

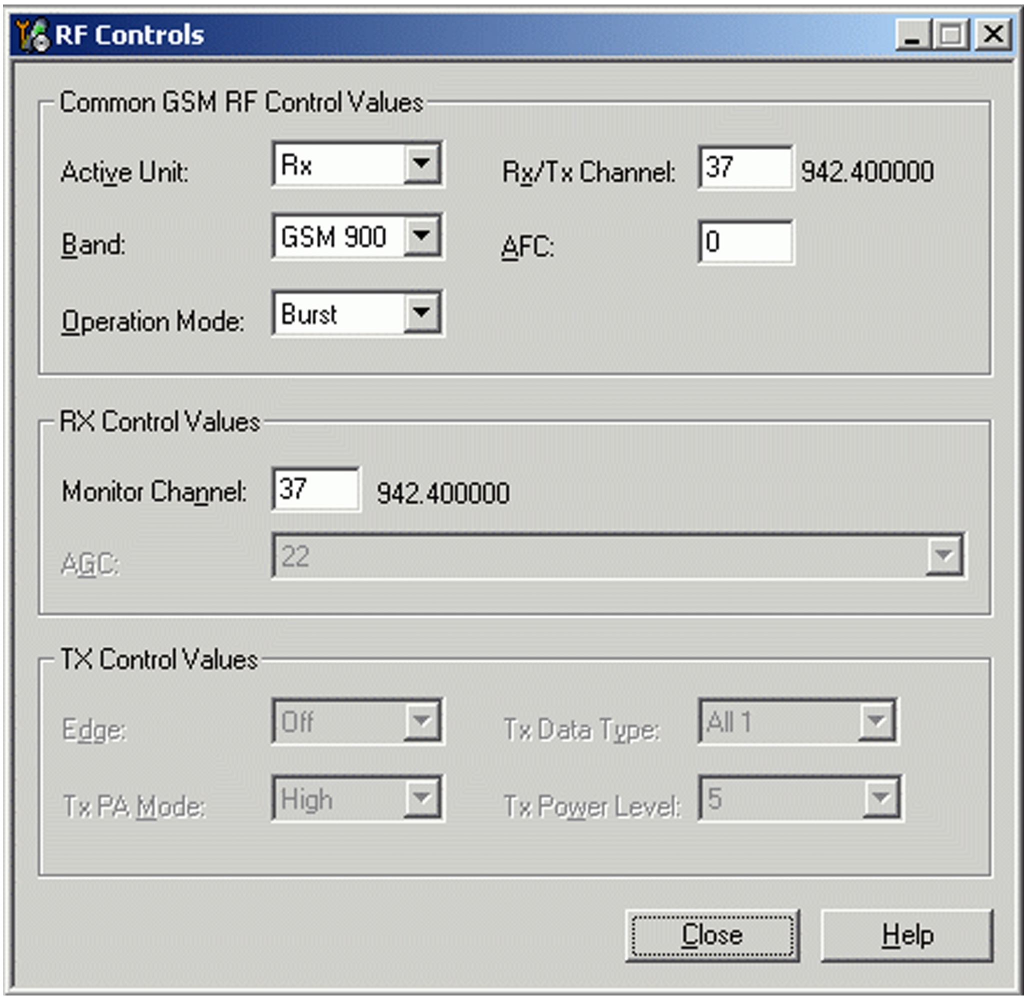


   - ii In the *RF Controls* window:
     - Select band.
     - Set Active unit to “Rx” (Default).
     - Set Operation mode to “Burst” (Default).
     - Set Rx/Tx channel (see table below).
     - Apply a frequency (see table below) to the RF-connector.

     Note: Remember to compensate for cable attenuation, specific for MJ-122. You will find the values in the Service tools section.

     Apply a signal to the RF-connector (remember to compensate for cable attenuation). See values in the table below.

Band	Channel (RX and TX)	Input frequency (MHz)	Offset (kHz)	Power level (dBm)
GSM850	190	881.66771	67.710	-90
GSM900	37	942.46771	67.710	-90
GSM1800	700	1842.86771	67.710	-90
GSM1900	661	1960.06771	67.710	-90


RF Controls
Common GSM RF Control Values
RX Control Values
TX Control Values
Close
Help

Active Unit: Rx
Rx/Tx Channel: 37 942.400000
Band: GSM 900
AFC: 0
Operation Mode: Burst
Monitor Channel: 37 942.400000
AGC: 22
Edge: Off
Tx Data Type: All 1
Tx PA Mode: High
Tx Power Level: 5

Figure 43 RF Controls window

Receiver (RX) troubleshooting

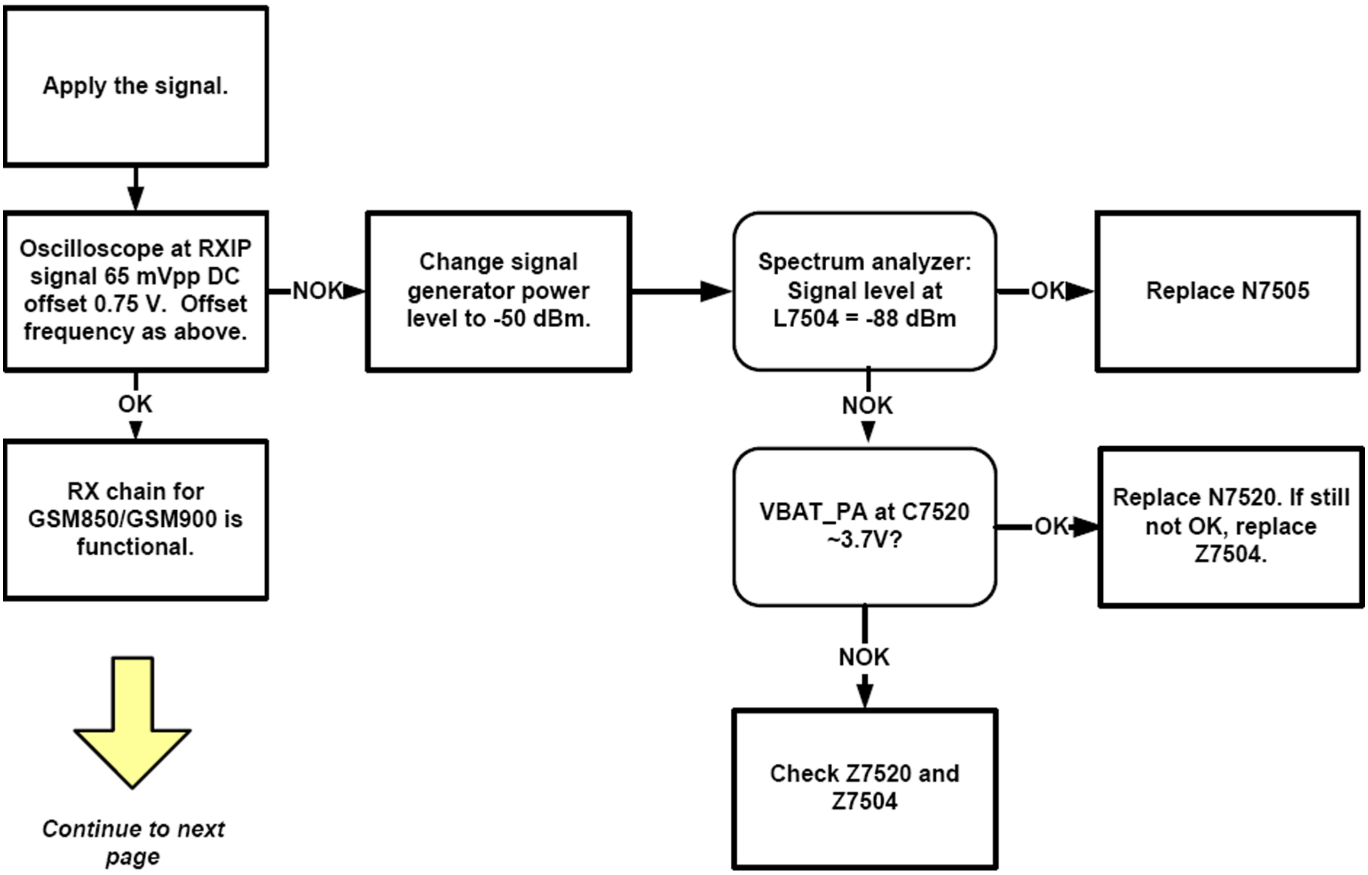
Context

Troubleshoot one band at a time. Start with GSM850 (RM-222) or GSM900 (RM-217), and end with GSM1900.

Receiver troubleshooting

Apply a signal according to the table in General instructions for RX troubleshooting (page 7–7)

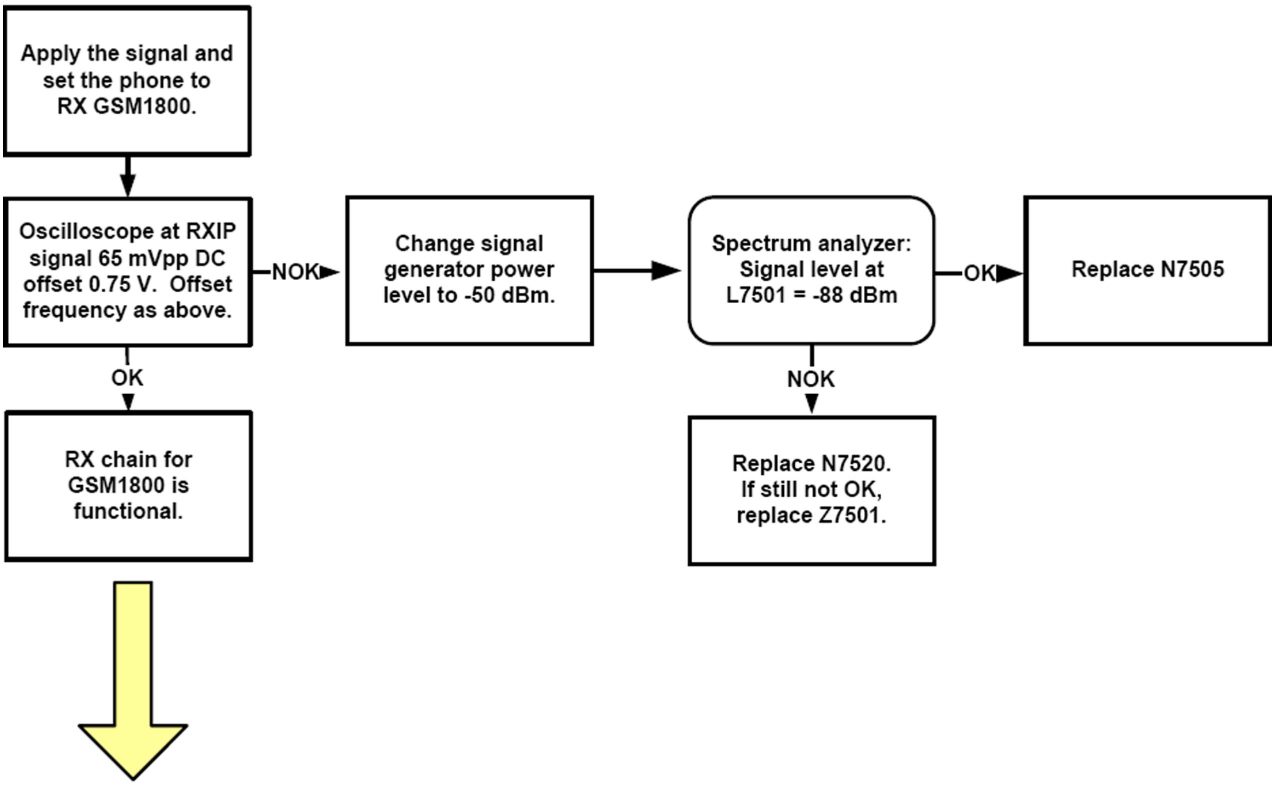
GSM850 or GSM900


Apply the signal.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7504 = -88 dBm
OK
Replace N7505
OK
RX chain for GSM850/GSM900 is functional.
NOK
VBAT_PA at C7520 ~3.7V?
OK
Replace N7520. If still not OK, replace Z7504.
NOK
Check Z7520 and Z7504

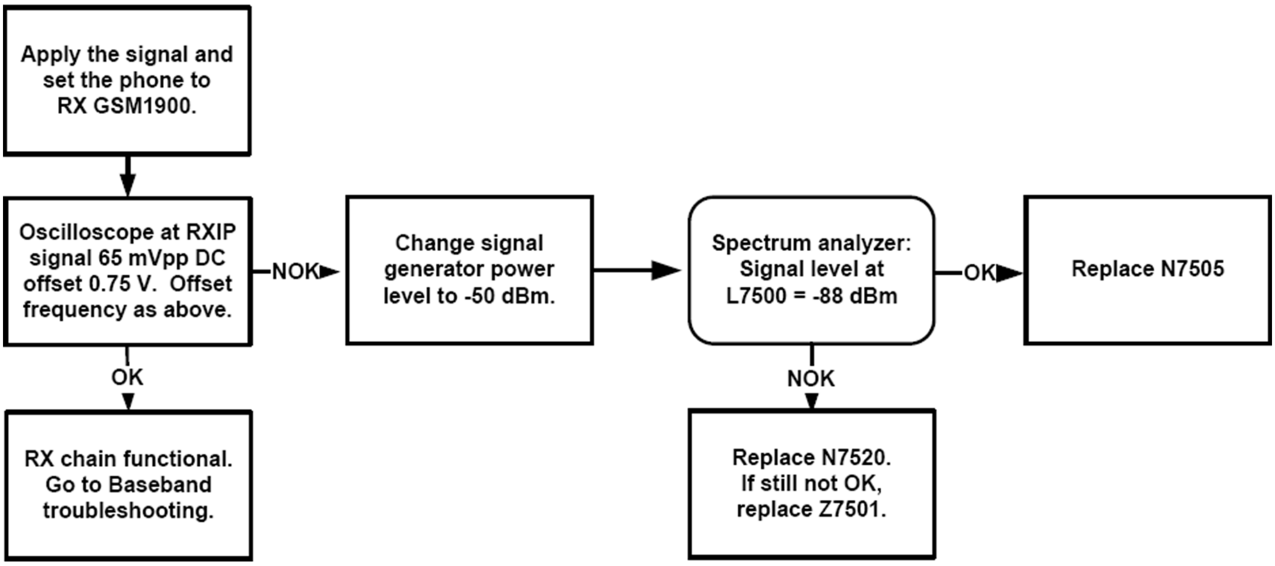
Continue to next page

Continued from previous page

GSM1800


Apply the signal and set the phone to RX GSM1800.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7501 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain for GSM1800 is functional.

GSM1900


Apply the signal and set the phone to RX GSM1900.
Oscilloscope at RXIP signal 65 mVpp DC offset 0.75 V. Offset frequency as above.
NOK
Change signal generator power level to -50 dBm.
Spectrum analyzer: Signal level at L7500 = -88 dBm
OK
Replace N7505
NOK
Replace N7520. If still not OK, replace Z7501.
OK
RX chain functional. Go to Baseband troubleshooting.

GSM Rx chain activation for manual measurements / GSM RSSI measurement

Context

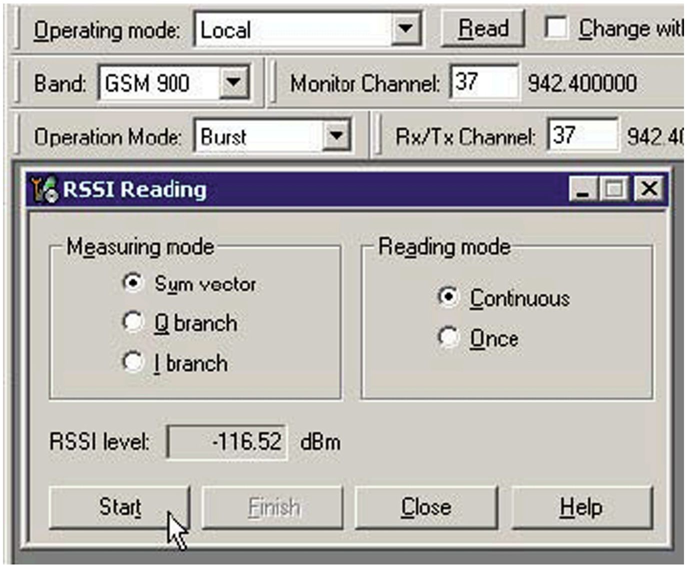
RSSI signal measurement is the main Rx troubleshooting measurement. The test measures the strength of the received signal.

I and Q branches can be measured separately. In GSM, the input signal can be either a real GSM signal or a CW (Continuous Wave) signal that is 67.771 kHz above the carrier frequency.

Steps

1. Start *Phoenix* service software.
2. Choose **Testing→GSM→RSSI Reading** .
3. Set the RF signal generator for a channel frequency +67.771 kHz in CW mode with a –80 dBm signal level.

   Alternatively set the cellular tester downlink channel to the appropriate channel. Make sure that the tester is set to continuous mode, not to burst mode.
4. In the *RSSI Reading* window, select the appropriate band and channel.



Operating mode: Local

Band: GSM 900

Monitor Channel: 37 942.400000

Operation Mode: Burst

Rx/Tx Channel: 37 942.4

RSSI Reading

Measuring mode: ● Sum vector ○ Q branch ○ I branch

Reading mode: ● Continuous ○ Once

RSSI level: -116.52 dBm

Figure 44 ***RSSI Reading*** **window**

5. To start the measurement, activate GSM Rx chain, click **Start**.

Results

RSSI reading values of the selected band and channel are displayed. The RSSI level must be the same value as that which is set at the signal generator (-80 dBm).

Transmitter troubleshooting

General instructions for TX troubleshooting

Context

- Tx troubleshooting requires Tx operation.
- Do not transmit on frequencies that are in use!
- Transmitter can be controlled in the local mode for diagnostic purposes.
- The most useful Phoenix tool for GSM transmitter testing is "RF Controls".

- Tx IQ tuning and Tx power tuning can be also used in some cases.
- Remember that retuning is not a fix! Phones are tuned correctly in production.

The first set of steps instructs how to assemble the test setup. This setup is general for all Tx troubleshooting tasks.

Alternative steps provide specific troubleshooting instructions for *Phoenix* service software.

> **Caution:** Never activate the GSM transmitter without a proper antenna load. There should be always 50 Ω load connected to the RF connector (antenna, RF-measurement equipment or at least 2 W dummy load), otherwise the GSM Power amplifier may be damaged.

Steps

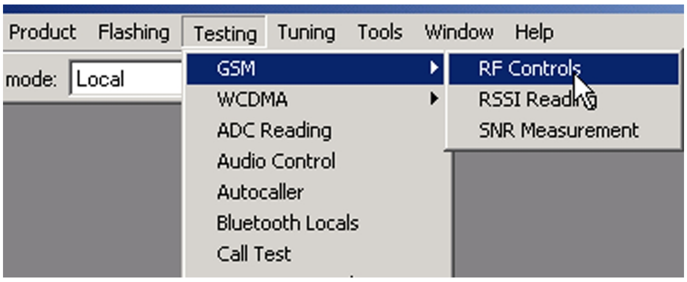
1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

   Make sure that you have a PKD-1 dongle connected to the computer's parallel port.
2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-122) and measurement equipment or alternatively use a 50 Ω (at least 2 W) dummy load in the module test jig RF connector, otherwise GSM may be damaged.

   > **Note:** There are two antenna connectors in the module jig:
   > - one for GSM
   > - one for Bluetooth
   >
   > Make sure that all connections are made to the correct RF connector.

   Normally a spectrum analyser is used as measurement equipment.

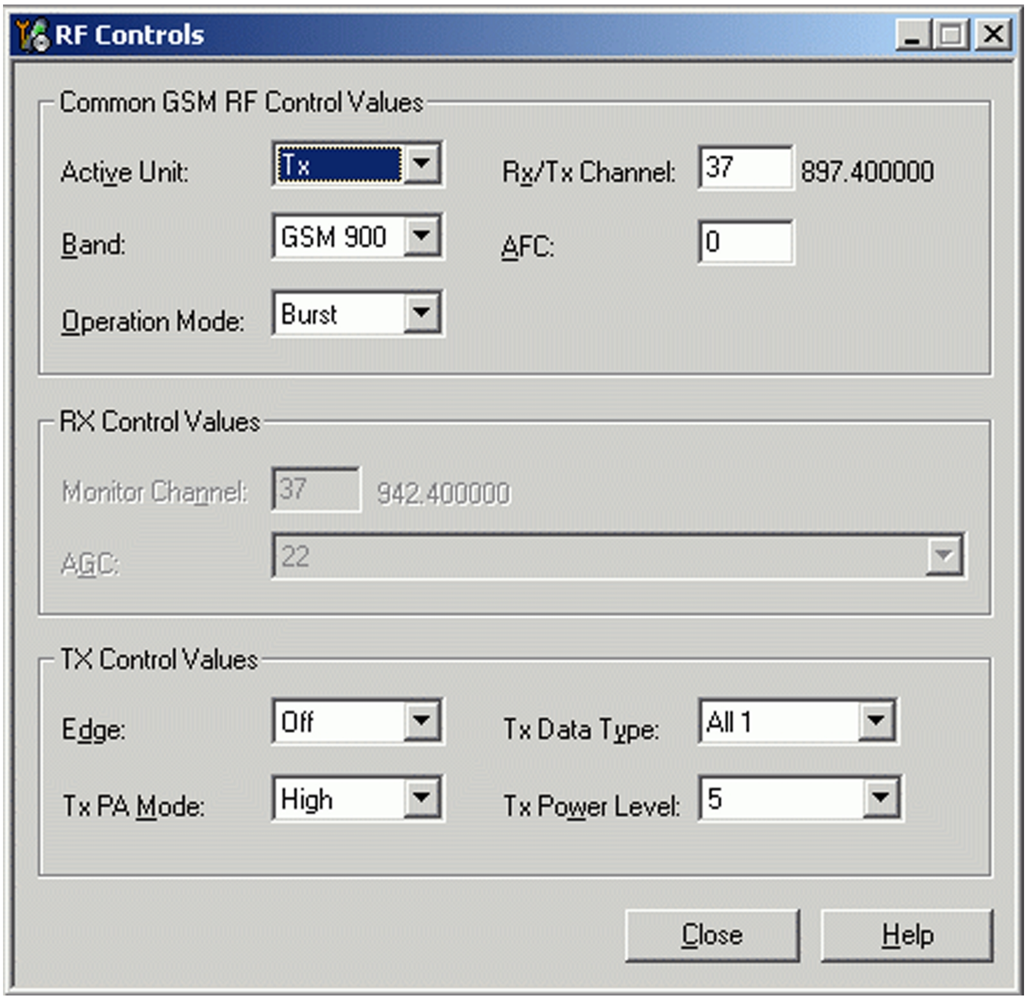
   > **Note:** The maximum input power of a spectrum analyser is +30 dBm.
   >
   > To prevent any damage, it is recommended to use 10 dB attenuator on the spectrum analyzer input.
4. Set Tx on.
   - i Set the phone module to the test jig and start *Phoenix service software*.
   - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10_USB or FPS10_TCP drivers, depending on connection type. When using DAU-9S select FBUS driver).
   - iii From the File menu, choose product: **File -> Choose Product -> xx-x*** (* = type designator of the phone, e.g. RM-217/222), or press**Ctrl + R** to scan product.
   - iv From the toolbar, set operating mode to “Local”.
5. GSM850/900/1800/1900 troubleshooting
   - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls** .



   - ii In the *RF Controls* window:
     - Select band "GSM850", “GSM900” or “GSM1800” or “GSM1900”.
     - Set Active unit to “Tx” (Default = “Rx”).

- Set Operation mode to “Burst” (Default).
- Set Tx data type to “All1” (Default).
- Set Rx/Tx channel (see table below)
- Set Edge to “Off” (Default).
- Set Tx PA mode to “High” (Default).
- Set power level (see table below)

Band	Channel (RX and TX)	TX power level
GSM850	190	5
GSM900	37	5
GSM1800	700	0
GSM1900	661	0



Common GSM RF Control Values
Active Unit: Tx
Rx/Tx Channel: 37 897.400000
Band: GSM 900
AFC: 0
Operation Mode: Burst

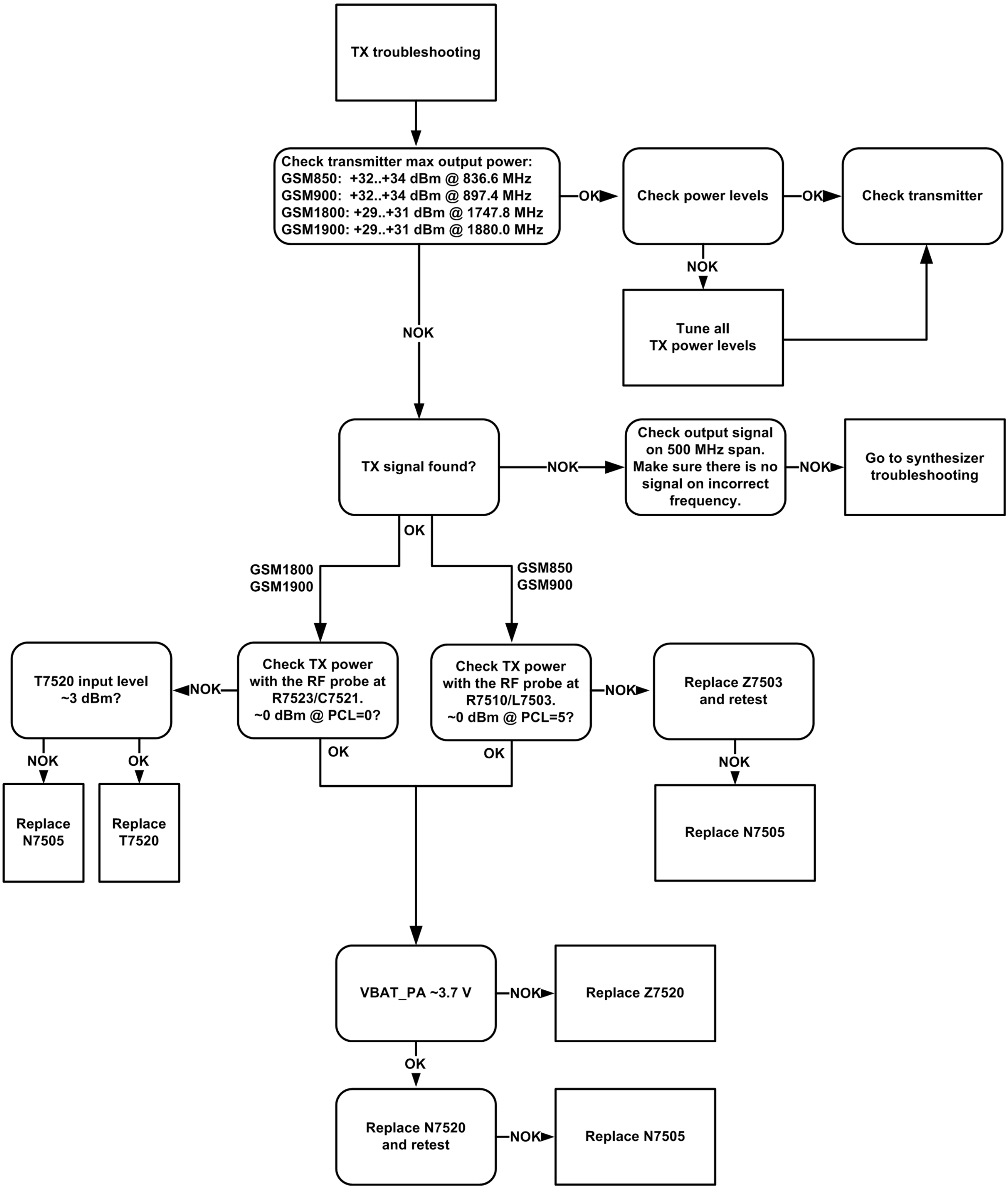
RX Control Values
Monitor Channel: 37 942.400000
AGC: 22

TX Control Values
Edge: Off
Tx Data Type: All 1
Tx PA Mode: High
Tx Power Level: 5

Figure 45 RF Controls window

Transceiver (TX) troubleshooting

Troubleshooting flow


TX troubleshooting
Check transmitter max output power:
GSM850: +32..+34 dBm @ 836.6 MHz
GSM900: +32..+34 dBm @ 897.4 MHz
GSM1800: +29..+31 dBm @ 1747.8 MHz
GSM1900: +29..+31 dBm @ 1880.0 MHz
OK
Check power levels
OK
Check transmitter
NOK
Tune all TX power levels
NOK
TX signal found?
NOK
Check output signal on 500 MHz span. Make sure there is no signal on incorrect frequency.
NOK
Go to synthesizer troubleshooting
OK
GSM1800
GSM1900
GSM850
GSM900
T7520 input level ~3 dBm?
NOK
Check TX power with the RF probe at R7523/C7521. ~0 dBm @ PCL=0?
Check TX power with the RF probe at R7510/L7503. ~0 dBm @ PCL=5?
NOK
Replace Z7503 and retest
NOK
OK
NOK
Replace N7505
Replace T7520
OK
OK
Replace N7505
VBAT_PA ~3.7 V
NOK
Replace Z7520
OK
Replace N7520 and retest
NOK
Replace N7505

Checking antenna functionality

GSM antenna

In the GSM antenna, there is one feed and two GND contacts.

Between GND1 and Feed, a DC short-circuit can be measured.

GND2 has no DC connection to the other contacts.

The antenna is functioning normally, if the contact pads hit the antenna C-clips on the PWB and the antenna is visually intact.

BT antenna

The BT antenna is (as the GSM antenna) placed on the flex foil on the antenna module. It has one feed and one short contact. The antenna is functioning normally, if the contact pads hit the antenna C-clips on the PWB and the antenna is visually intact.

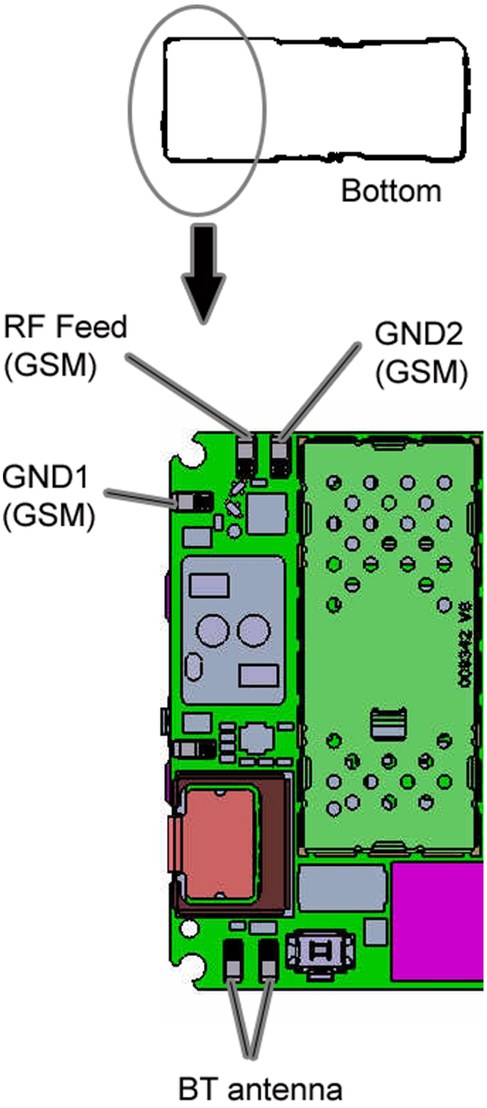


Figure 46 Location of the GSM and BT antenna C-clips on the PWB

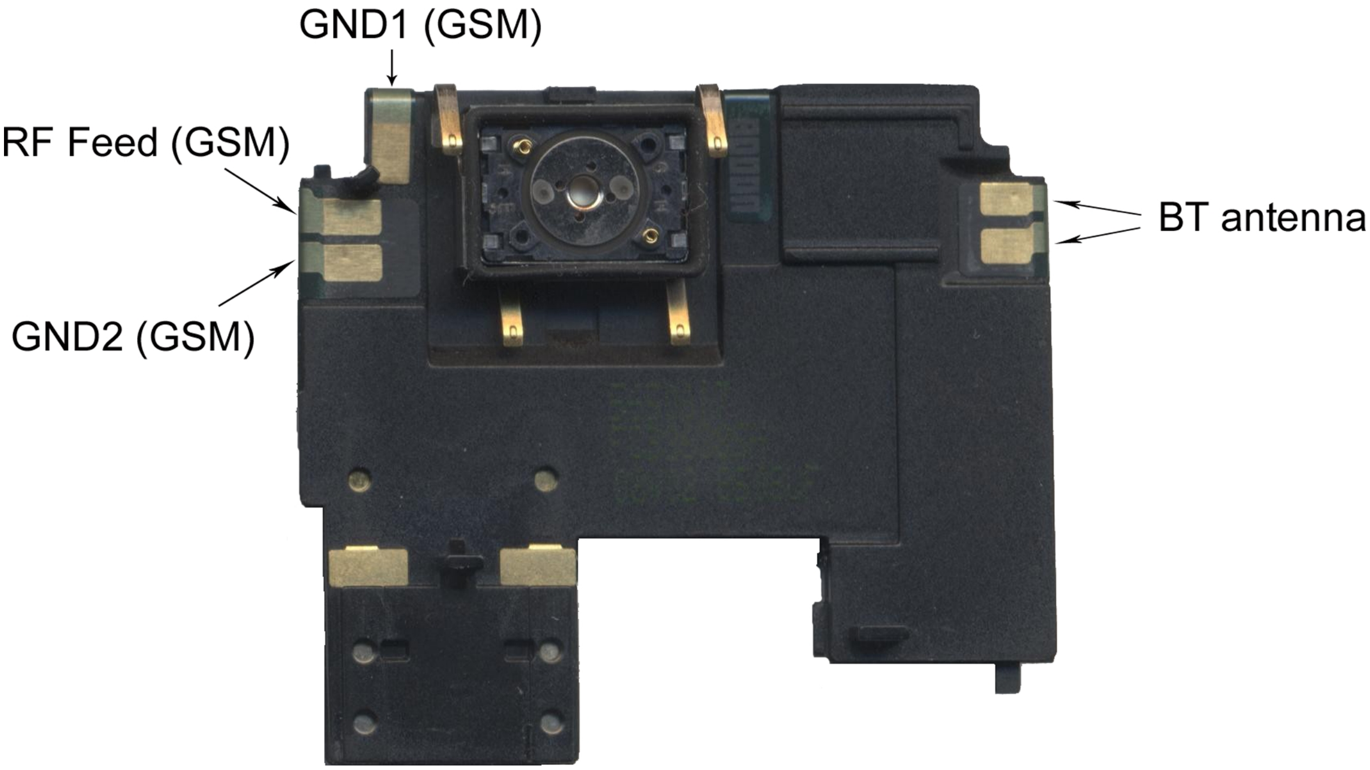


Figure 47 GSM and BT antenna contact pads on the antenna module

Antenna C-clips

When checking the antenna functionality, you can also check that the antenna C-clips are intact (that is, there are no cracks/bends in them).

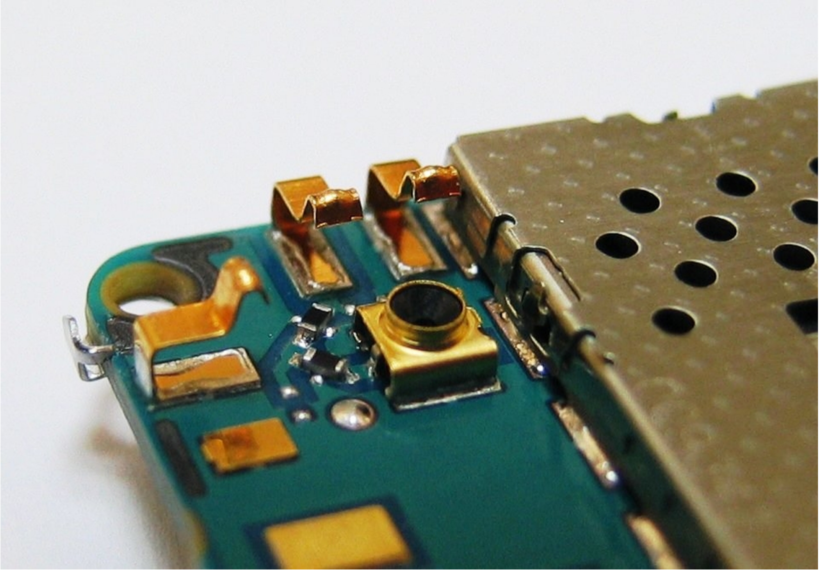
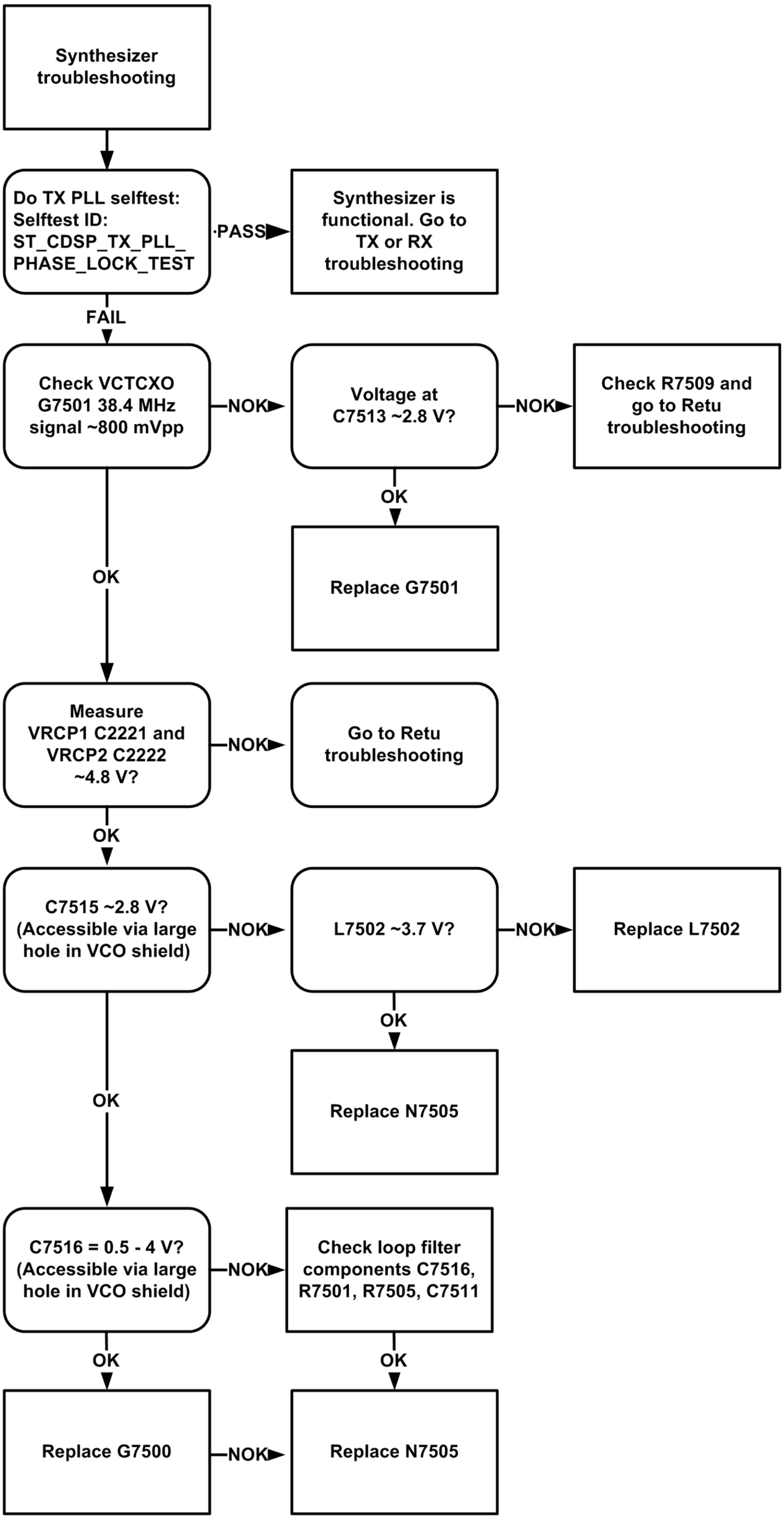


Figure 48 Antenna C-clips on the PWB

Synthesizer troubleshooting

Synthesizer troubleshooting


Synthesizer troubleshooting
Do TX PLL selftest: Selftest ID: ST_CDSP_TX_PLL_ PHASE_LOCK_TEST
PASS
Synthesizer is functional. Go to TX or RX troubleshooting
FAIL
Check VCTCXO G7501 38.4 MHz signal ~800 mVpp
NOK
Voltage at C7513 ~2.8 V?
NOK
Check R7509 and go to Retu troubleshooting
OK
Replace G7501
OK
Measure VRCP1 C2221 and VRCP2 C2222 ~4.8 V?
NOK
Go to Retu troubleshooting
OK
C7515 ~2.8 V? (Accessible via large hole in VCO shield)
NOK
L7502 ~3.7 V?
NOK
Replace L7502
OK
Replace N7505
OK
C7516 = 0.5 - 4 V? (Accessible via large hole in VCO shield)
NOK
Check loop filter components C7516, R7501, R7505, C7511
OK
OK
Replace G7500
NOK
Replace N7505

RF tunings

Introduction to RF tunings

Important: Only perform RF tunings if:

- one or more of the RF components have been replaced
- flash memory chip is replaced or corrupted.

RF calibration is always performed with the help of a product-specific module jig (MJ-122), never with an RF coupler. Using an RF coupler in the calibration phase will cause a complete mistuning of the RF part.

Important: After RF component replacements, **always** use autotuning. Manual tunings are only required in rare cases.

Cable and adapter losses

RF cables and adapters have some losses. They have to be taken into account when the phone is tuned. As all RF losses are frequency dependent, the user has to act very carefully and understand the measurement setup.

For RF attenuations of the module jig, please refer to the Service tools section.

Auto tuning for BB5.0

This phone can be tuned automatically.

Autotune is designed to align the phone's RF part easier and faster. It performs calibrations, tunings and measurements of RX and TX. The results are displayed and logged in a result file, if initiated.

Hardware set up

Hardware requirements for auto tuning:

- PC (Windows 2000/XP) with GPIB card
- Power supply
- Product specific module jig
- Cables: XRF-1 (RF cable), USB cable, GBIP cable and DAU-9S
- Signal analyser (TX), signal generator (RX) and RF-splitter *or* one device including all.

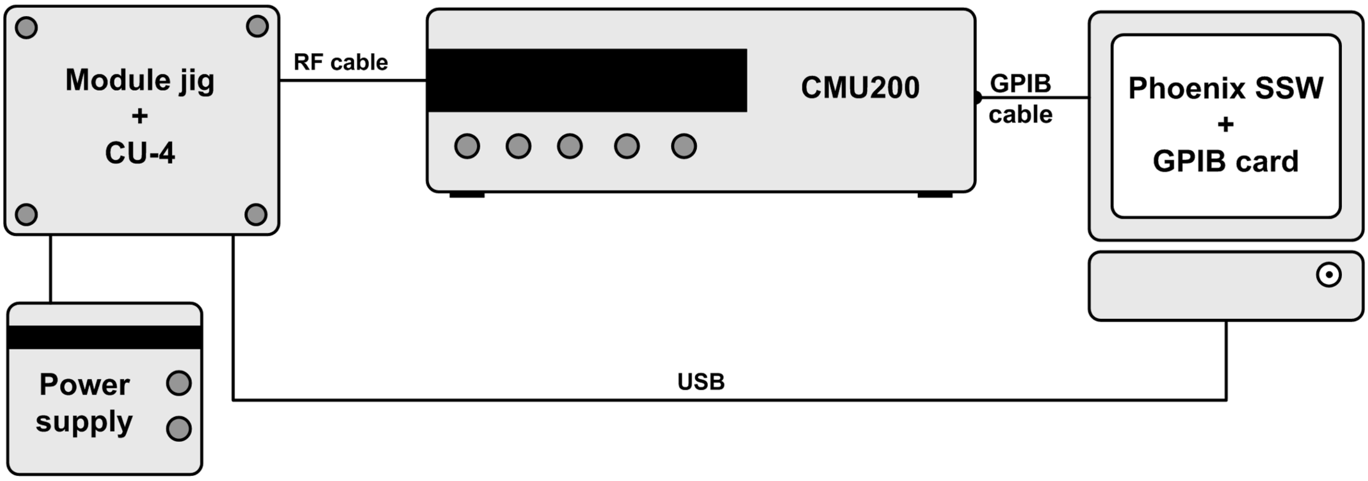


Figure 49 Auto tuning concept with CMU200

Phoenix preparations

Install the phone specific data package, for example *RM-217/222_dp_1.78_sw_sh3.26.exe*. This defines phone specific settings..

Auto tuning procedure

1 Make sure the phone (in the jig) is connected to the equipment. Else, some menus will not be shown in Phoenix.
2 To go to autotune, select *Tuning (Alt-U)* > *Auto-Tune (Alt-A)* from the menu.
3 Start autotuning, clicking the *Tune* button.

System mode independent manual tunings

RF channel filter calibration

Context

Rf channel filter calibration tunes the internal low pass filters of the RF ASIC, that limit the bandwidth of BB IQ signals.

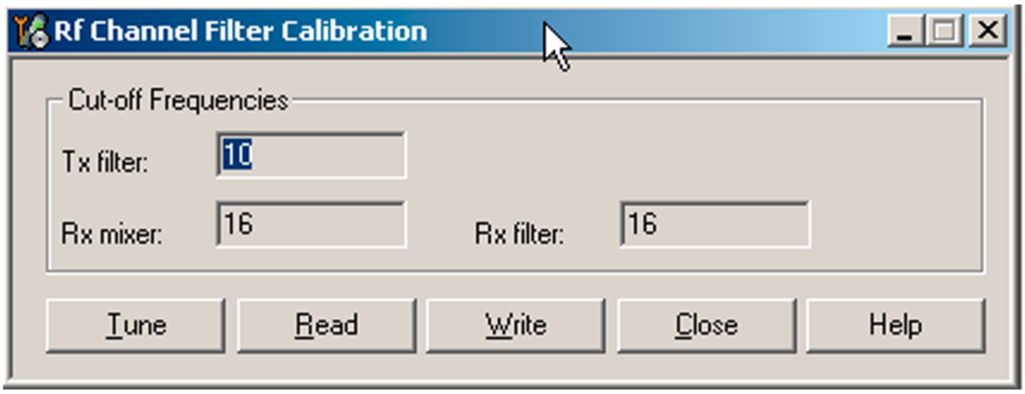
Table 11 Rf channel filter calibration tuning limits

	Min	Typ	Max
Tx filter	0	10	31
RX mixer	0	13	31
Rx filter	0	16	31

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning**→**Rf Channel Filter Calibration** .
3. Click **Tune**.
4. To save the values to the PMM (Phone Permanent Memory) area, click **Write**.
5. To close the *Rf Channel Filter Calibration* window, click **Close**.

Results



Tx filter: 10
Rx mixer: 16
Rx filter: 16

Figure 50 Rf channel filter calibration typical values

PA (power amplifier) detection

Context

The PA detection procedure detects which PA manufacturer is used for phone PAs.

If a PA is changed or if the permanent memory (PMM) data is corrupted, PA detection has to be performed before Tx tunings.

Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning→PA Detection** .
3. Click **Tune**.
4. Check that the detected PA manufacturers are corresponding to the actual chips on the board.
5. To end the procedure, click **Close**.

GSM receiver tunings

Rx calibration (GSM)

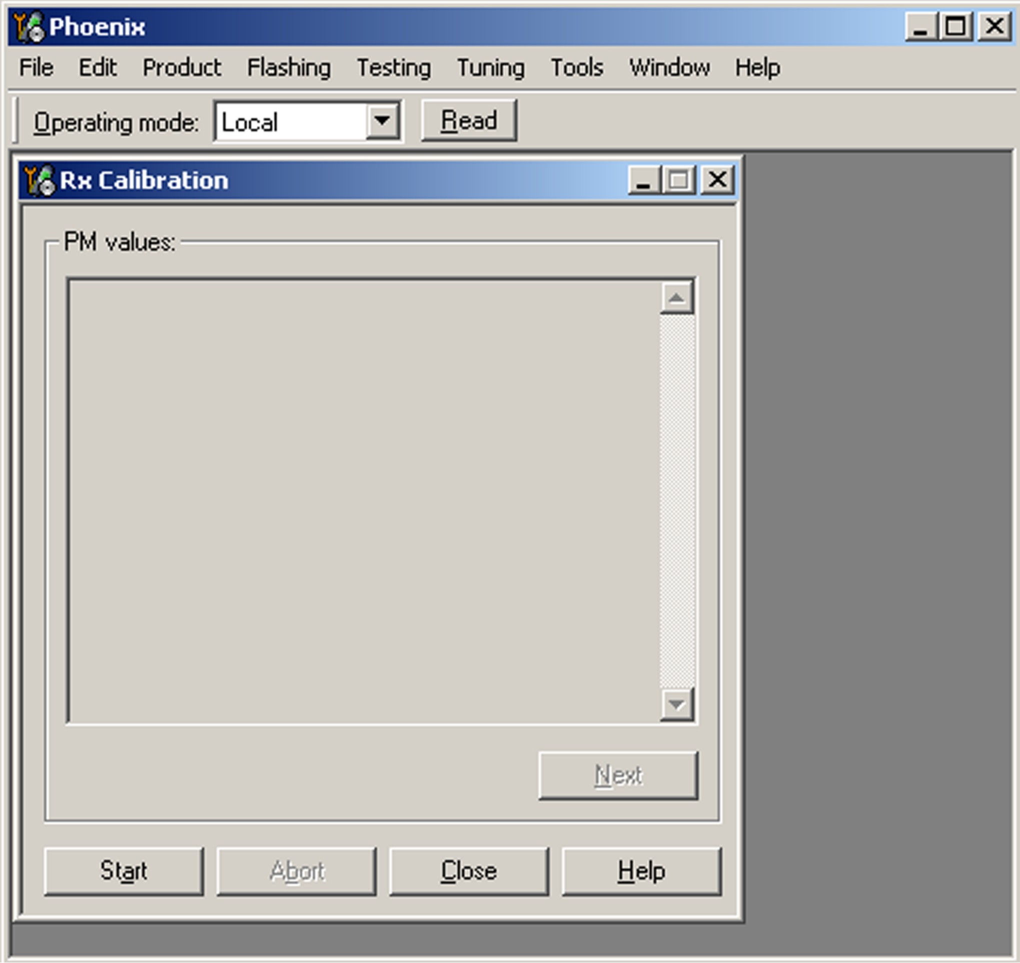
Context

Rx Calibration is used to find out the real gain values of the GSM Rx AGC system and tuning response of the AFC system (AFC D/A init value and AFC slope)

Steps

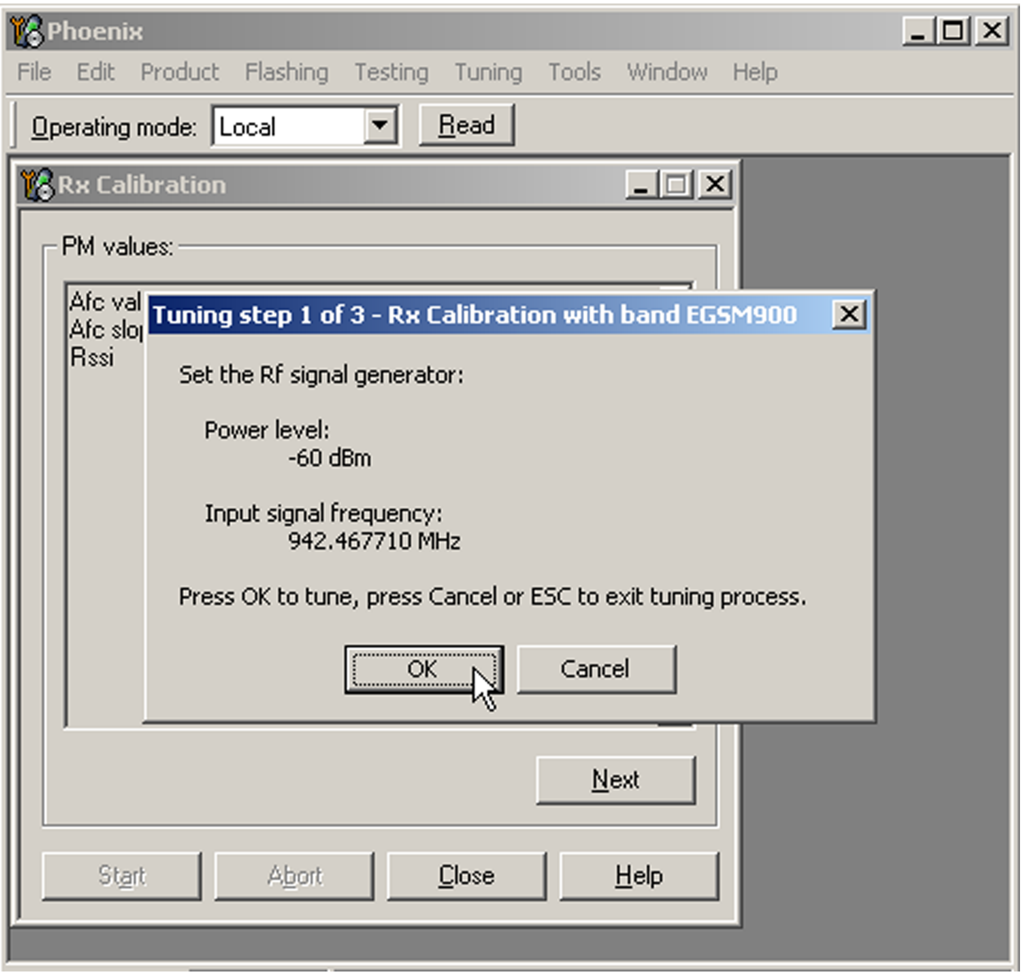
1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning→GSM→Rx Calibration** .

5. Click **Start**.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Next
Start
Abort
Close
Help

6. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the **Rx Calibration with band EGSM900** (step 1-3) pop-up window.

   Important: The calibration uses a non-modulated CW signal. Increase the signal generator level by cable attenuation and module jig probe attenuation.


Phoenix
File Edit Product Flashing Testing Tuning Tools Window Help
Operating mode: Local
Read
Rx Calibration
PM values:
Afc val
Afc slo
Rssi
Next
Start
Abort
Close
Help

Tuning step 1 of 3 - Rx Calibration with band EGSM900

Set the Rf signal generator:

Power level:
-60 dBm

Input signal frequency:
942.467710 MHz

Press OK to tune, press Cancel or ESC to exit tuning process.

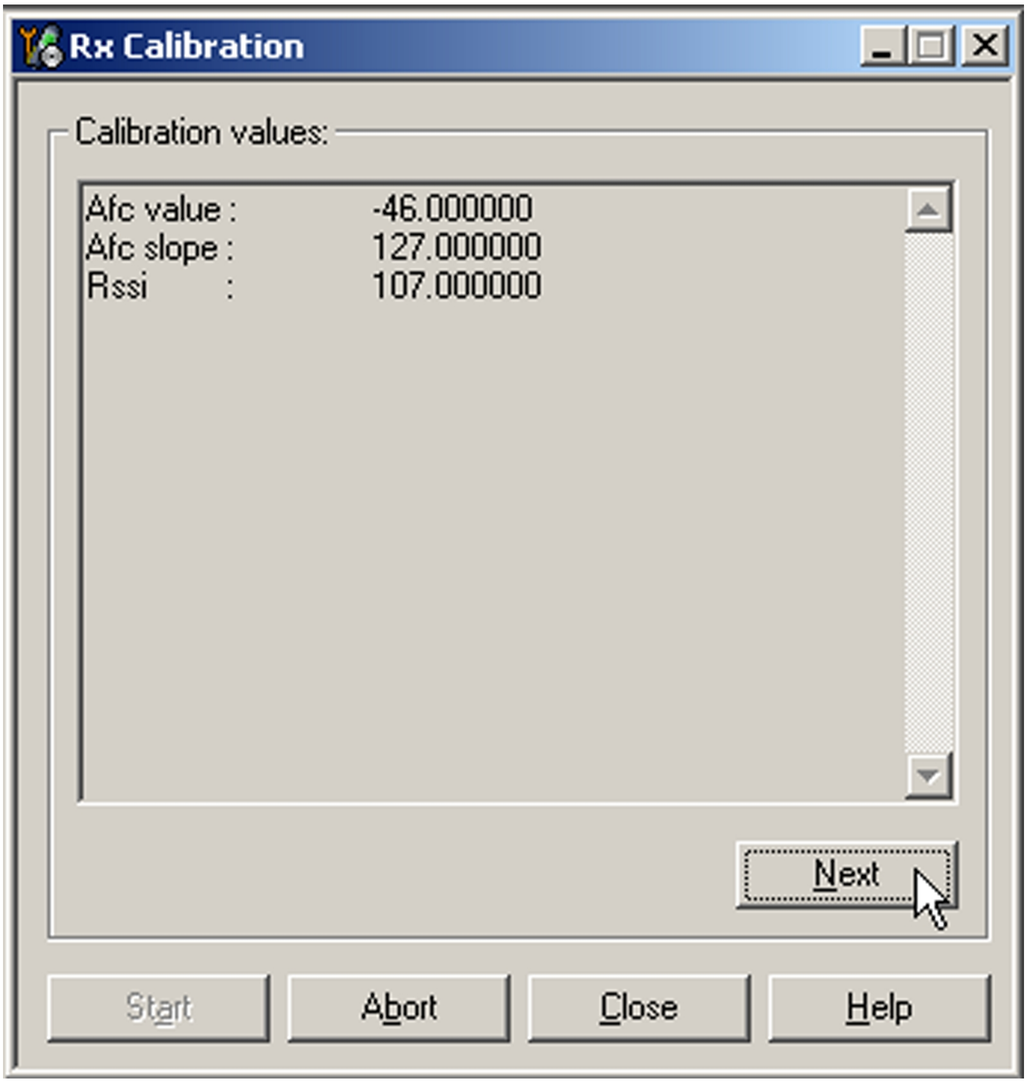
OK
Cancel

7. To perform the tuning, click **OK**.
8. Check that the tuning values are within the limits specified in the following table:

Table 12 RF tuning limits in Rx calibration

	Min	Typ	Max	Unit
GSM850				
AFC Value (init)	-200	-80..40	200	-
AFC slope	0	108..121	200	-
RSSI (AGC-0)	106	107..110	114	dB
GSM900				
AFC Value (init)	-200	-105..62	200	-
AFC slope	0	122	200	-
RSSI (AGC-0)	106	107...110	114	dB
GSM1800				
RSSI (AGC-0)	105	105...109	114	dB
GSM1900				
RSSI (AGC-0)	105	105...109	114	dB

9. Click **Next** to continue with GSM1800 Rx tuning.



Afc value : -46.000000
Afc slope : 127.000000
Rssi : 107.000000

Next actions

Repeat steps 6 to 9 for GSM1800 and GSM1900

Rx band filter response compensation (GSM)

Prerequisites

Rx calibration must be performed before the Rx band filter response compensation.

Context

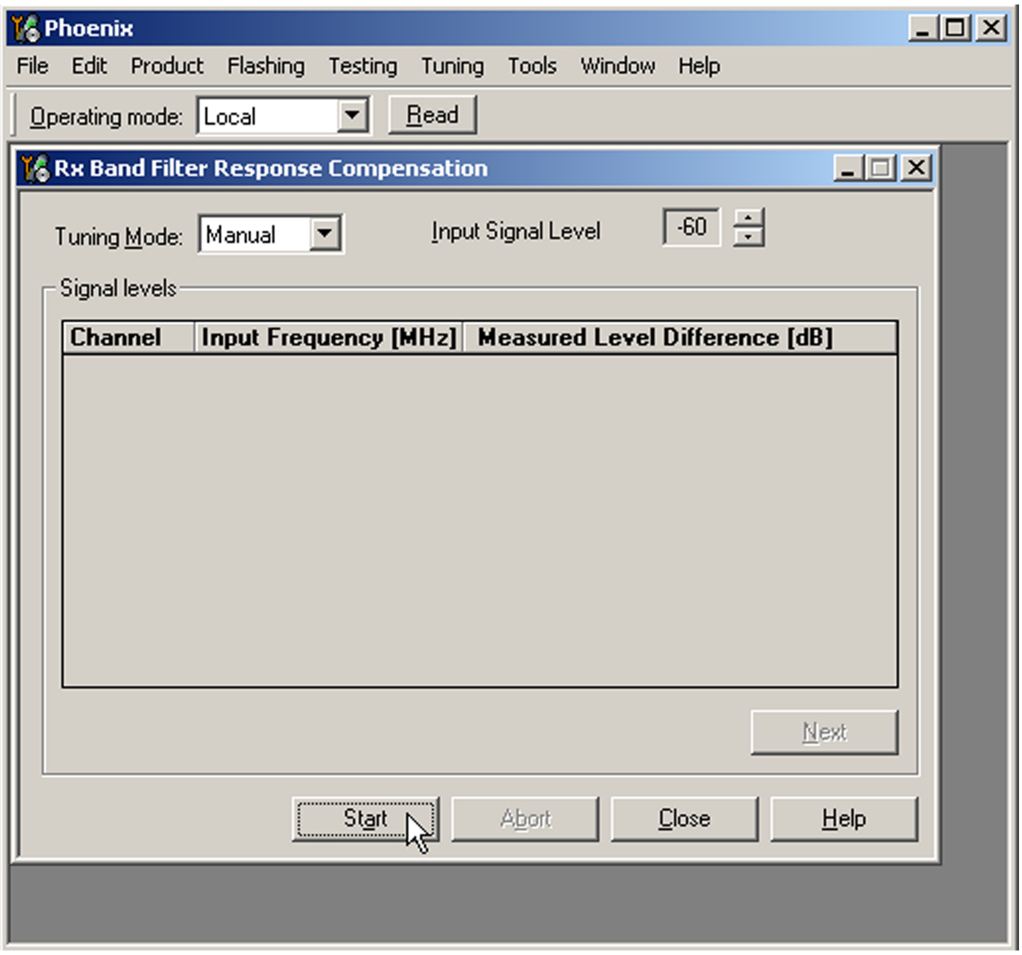
On each GSM Rx band, there is a band filter in front of the RF ASIC front end. The amplitude ripple caused by these filters causes ripple to the RSSI measurement, and therefore calibration is needed.

The calibration has to be repeated for each GSM band.

Steps

1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.

4. Select **GSM850** or **GSM900** band.
5. Choose **Tuning→GSM→Rx Band Filter Response Compensation** .
6. Select **Tuning mode: manual**
7. Click **Start**.


Phoenix
File
Edit
Product
Flashing
Testing
Tuning
Tools
Window
Help
Read
Rx Band Filter Response Compensation
Signal levels
Next
Start
Abort
Close
Help

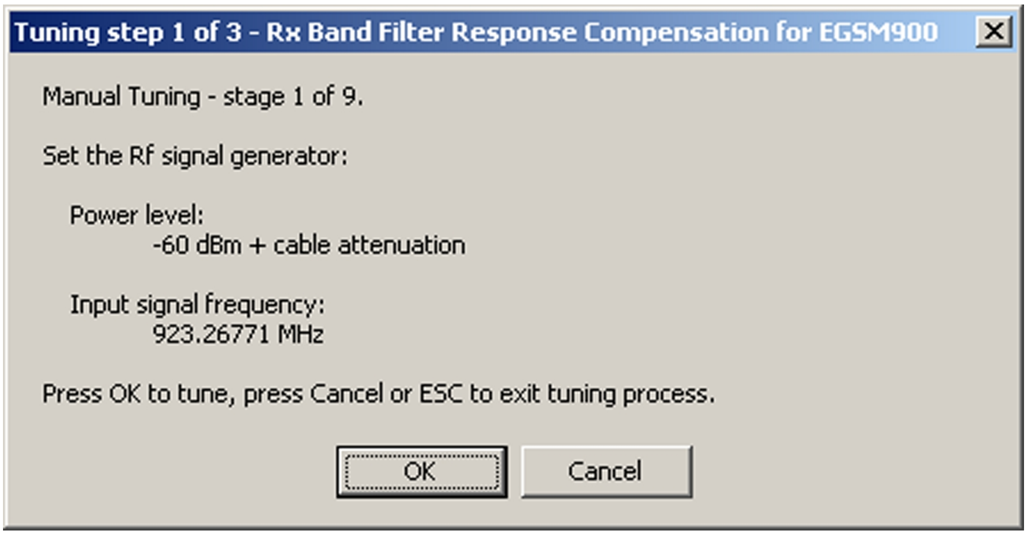
Operating mode: Local

Tuning Mode: Manual

Input Signal Level -60

Channel	Input Frequency [MHz]	Measured Level Difference [dB]

8. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the *Rx Band Filter Response Compensation for EGSM850/EGSM900* pop-up window, step 1-3.


Tuning step 1 of 3 - Rx Band Filter Response Compensation for EGSM900
OK
Cancel

Manual Tuning - stage 1 of 9.

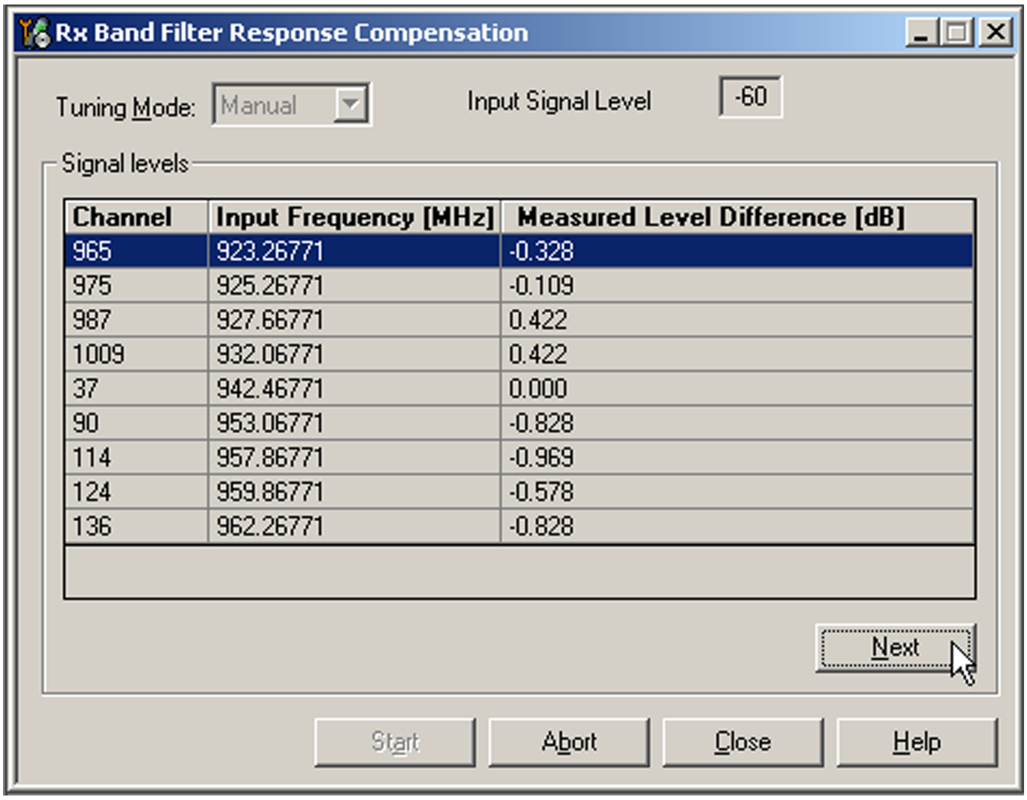
Set the Rf signal generator:

Power level:
-60 dBm + cable attenuation

Input signal frequency:
923.26771 MHz

Press OK to tune, press Cancel or ESC to exit tuning process.

9. To perform tuning, click **OK**.
10. Go through all 9 frequencies. The following table will be shown:



Tuning Mode: Manual

Input Signal Level -60

Channel	Input Frequency [MHz]	Measured Level Difference [dB]
965	923.26771	-0.328
975	925.26771	-0.109
987	927.66771	0.422
1009	932.06771	0.422
37	942.46771	0.000
90	953.06771	-0.828
114	957.86771	-0.969
124	959.86771	-0.578
136	962.26771	-0.828

11. Check that the tuning values are within the limits specified in the following table:

	Min	Typ	Max	Unit
GSM850				
Ch. 118/867.26771 MHz	-6	-1	2	dB
Ch. 128/869.26771 MHz	-3	0	2	dB
Ch. 140/871.66771 MHz	-3	0	2	dB
Ch. 172/878.06771 MHz	-2	0	2	dB
Ch. 190/881.66771 MHz	-2	0	2	dB
Ch. 217 / 887.06771 MHz	-2	0	2	dB
Ch. 241/891.86771 MHz	-3	0	2	dB
Ch. 251/893.86771 MHz	-3	0	2	dB
Ch. 261/895.86771 MHz	-6	-1	-2	dB
GSM900				
Ch. 965 / 923.26771 MHz	-6	-1	2	dB
Ch. 975 / 925.26771 MHz	-3	0	2	dB
Ch. 987 / 927.66771 MHz	-3	0	2	dB
Ch. 1009 / 932.06771 MHz	-2	0	2	dB

	Min	Typ	Max	Unit
Ch. 37 / 942.46771 MHz	-2	0	2	dB
Ch. 90 / 953.06771 MHz	-2	0	2	dB
Ch. 114 / 957.86771 MHz	-3	0	2	dB
Ch. 124 / 959.86771 MHz	-3	0	2	dB
Ch. 136 / 962.26771 MHz	-6	-1	2	dB
GSM1800				
Ch. 497 / 1802.26771 MHz	-6	-1	3	dB
Ch. 512 / 1805.26771 MHz	-3	0	3	dB
Ch. 535 / 1809.86771 MHz	-3	0	3	dB
Ch. 606 / 1824.06771 MHz	-3	0	3	dB
Ch. 700 / 1842.86771 MHz	-3	0	3	dB
Ch. 791 / 1861.06771 MHz	-3	0	3	dB
Ch. 870 / 1876.86771 MHz	-3	0	3	dB
Ch. 885 / 1879.86771 MHz	-3	0	3	dB
Ch. 908 / 1884.46771 MHz	-6	-1	3	dB
GSM1900				
Ch. 496 / 1927.06771 MHz	-6	-1	2	dB
Ch. 512 / 1930.26771 MHz	-3	0	2	dB
Ch. 537 / 1935.26771 MHz	-3	0	2	dB
Ch. 586 / 1945.06771 MHz	-3	0	2	dB
Ch. 661 / 1960.06771 MHz	-3	0	2	dB
Ch. 736 / 1975.06771 MHz	-3	0	2	dB
Ch. 794 / 1986.66771 MHz	-3	0	2	dB
Ch. 810 / 1989.86771 MHz	-3	0	2	dB
Ch. 835 / 1994.86771 MHz	-6	-1	2	dB

12. If the values are within the limits, click **Next** to continue to the next band.

Next actions

Repeat the steps 8 to 12 for GSM1800 and GSM1900.

GSM transmitter tunings

Tx IQ tuning (GSM)

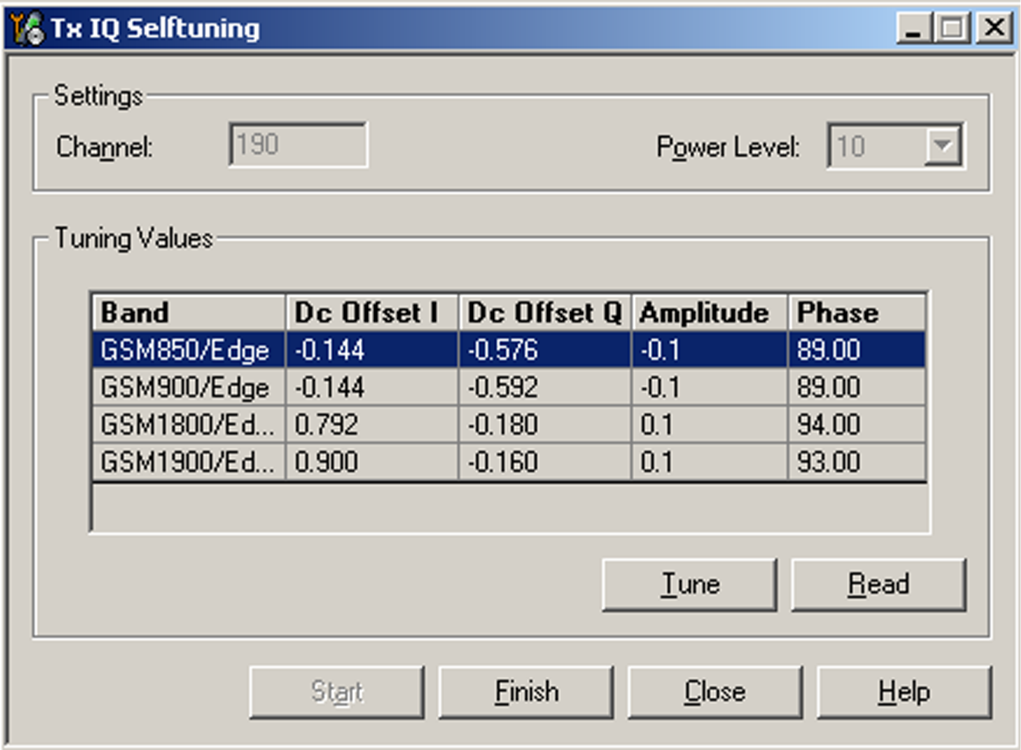
Context

The Tx path branches to I and Q signals at RF I/Q modulator. Modulator and analog hardware located after it cause unequal amplitude and phase disturbance to I and Q signal paths. Tx IQ tuning balances the I and Q branches.

Tx IQ tuning must be performed for all GSM bands.

Steps

1. Start *Phoenix* service software.
2. From the **Operating mode** drop-down menu, set mode to **Local**.
3. Choose **Tuning→GSM→Tx IQ Tuning** .
4. Select **Mode: Automatic**.



Channel: 190

Power Level: 10

Band	Dc Offset I	Dc Offset Q	Amplitude	Phase
GSM850/Edge	-0.144	-0.576	-0.1	89.00
GSM900/Edge	-0.144	-0.592	-0.1	89.00
GSM1800/Ed...	0.792	-0.180	0.1	94.00
GSM1900/Ed...	0.900	-0.160	0.1	93.00

5. Select band **GSM850** or **GSM900** and click **Start**.
6. Click **Next** to start GSM1800 band TX IQ tuning.
7. Click **Next** to start GSM1900 band TX IQ tuning.
8. Click**Finish** and then **Close**.

Next actions

Tuning sliders should be close to the center of the scale after the tuning and within the limits specified in the following table. If they are not within the limits, check Tx IQ quality manually.

	Min	Typ	Max	Unit
GSM850				
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM900				

	Min	Typ	Max	Unit
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
GSM1800/GSM1900				
I/Q DC	-6	0.5	6	%
Ampl	-1	0	1	dB
Phase	95	100	110	°

Tx power level tuning (GSM)

Context

Because of variations at the IC (Integrated Circuit) process and discrete component values, the actual transmitter RF gain of each phone is different. Tx power level tuning is used to find out mapping factors called 'power coefficients'. These adjust the GSM transmitter output power to fulfill the specifications.

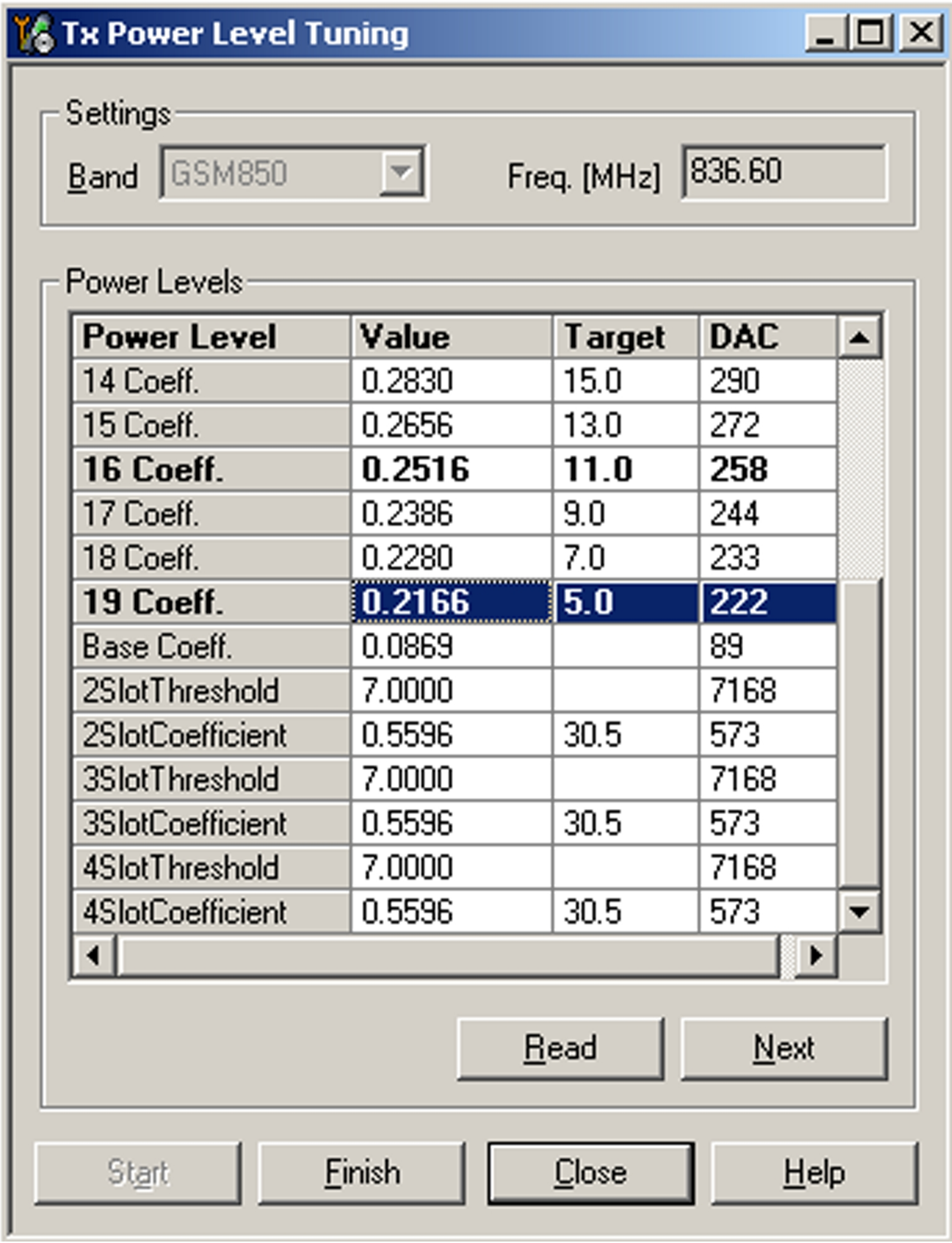
For EDGE transmission, the bias settings of the GSM PA are adjusted in order to improve linearity. This affects the PA gain and hence the power levels have to be aligned separately for EDGE transmission.

Tx power level tuning has to be performed on all GSM bands.

Steps

1. Connect the phone to a spectrum analyzer.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning→GSM→Tx Power Level Tuning** .

5. Click **Start**.l



Band: GSM850

Freq. [MHz]: 836.60

Power Level	Value	Target	DAC
14 Coeff.	0.2830	15.0	290
15 Coeff.	0.2656	13.0	272
16 Coeff.	**0.2516**	**11.0**	**258**
17 Coeff.	0.2386	9.0	244
18 Coeff.	0.2280	7.0	233
19 Coeff.	**0.2166**	**5.0**	**222**
Base Coeff.	0.0869		89
2SlotThreshold	7.0000		7168
2SlotCoefficient	0.5596	30.5	573
3SlotThreshold	7.0000		7168
3SlotCoefficient	0.5596	30.5	573
4SlotThreshold	7.0000		7168
4SlotCoefficient	0.5596	30.5	573

6. Set the spectrum analyzer for power level tuning:

Frequency	Channel frequency: • **836.6 MHz GSM850** • **897.4MHz GSM900** • **1747.8MHz GSM1800** • **1880MHz GSM1900**
Span	0 Hz
Sweep time	2ms
Trigger	Video triggering (-10dBm)

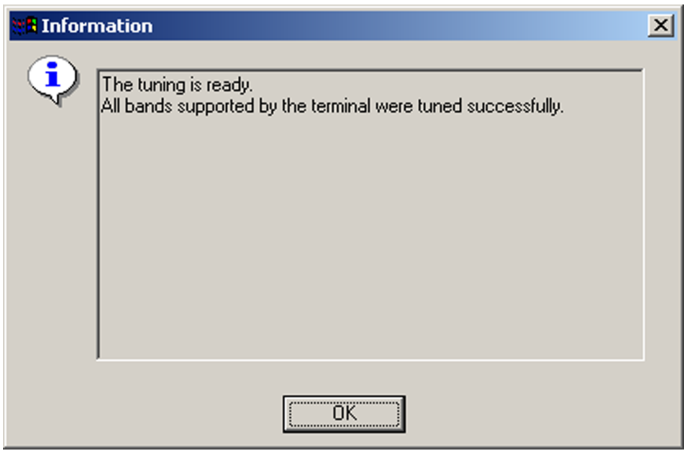
Resolution BW	3MHz
Video BW	3MHz
Reference level offset	sum cable attenuation with module jig attenuation
Reference level	33dBm

A power meter with a peak power detector can be also used. Remember to take the attenuations into account.

7. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.
8. If all bold power levels are adjusted, click **Next** to continue with **GSM850 EDGE**.
9. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing **+** or **–** keys.

Next actions

Continue tuning the bold power levels of the GSM900, GSM1800 and GSM1900 bands. You will see this message, if finished successfully:



The tuning is ready.
All bands supported by the terminal were tuned successfully.

8 — System module

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Phone description

Introduction

This chapter describes the system module including engine, power management, interfaces, audio etc.

The baseband is based on BB5.0 with a RAPGSM main processor and Retu/Tahvo energy management. All blocks that require high voltage process are in Tahvo and all other in Retu. The RF part is based on the ASIC Ahne.

RM-217/222 is a monoblock phone, in which all electrical components are assembled into one PWB.

RM-217 operates on the GSM 900/1800/1900 bands.

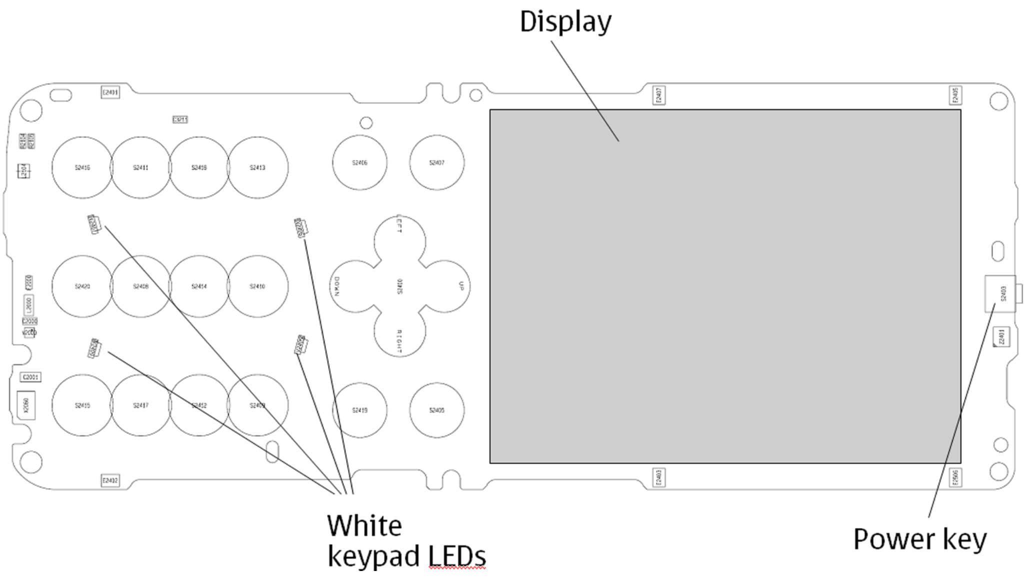
RM-222 operates on the GSM 850/1800/1900 bands.

Key components

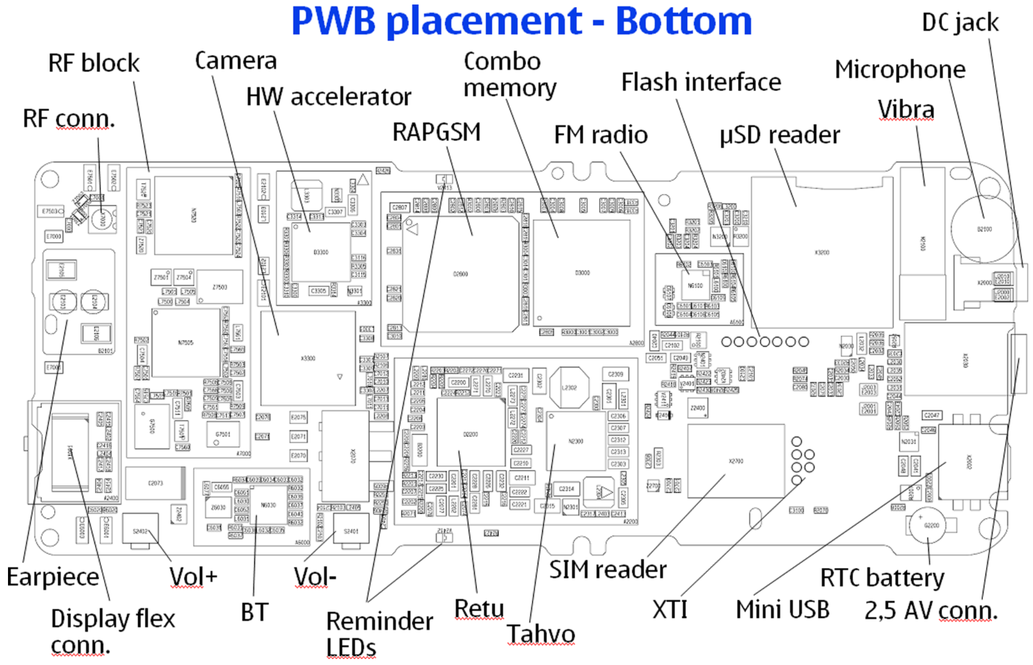
Function	Name	Item
Energy management	Retu Tahvo	D2200 N2300
Main processor	RAPGSM	D2800
Memory	Combo: 128 Mbit SDRAM & 256 Mbit NOR flash	D3000
RF ASIC	Ahne	N7505
Front end module	Power amplifier and Antenna Switch	N7520
Antenna	Antenna module assembly • RM-217: 900/1800/1900 MHz • RM-222: 850/1800/1900 MHz	
System connector	AV connector mini USB connector	X2030 X2002
Battery	BL-4C, 3.7 V, 860 mAh	
Bluetooth	BC4-ROM	N6030
FM radio	TEA5760	N6100
IHF Speaker	Donau or Aura (in antenna module assembly)	
Earpiece	RDF-07A 32OHM 10.86x7.40.2.2	B2101
Microphone	Clapton	B2100
Vibra	SMD VIBRA MOTOR	M2100
Charger connector	2 mm Nokia charger interface	X2000
Camera	2.0 Mpix SMIA85	
HWA	STV0984N	D3300
Display	QVGA 240 x 320, 2"	
LED driver	TPS 61061 YZFR	N2301
RTC battery	311 size	G2200

PWB overview

PWB placement - Top


Display
White
keypad LEDs
Power key

PWB placement - Bottom


DC jack
RF block
Camera
Combo
memory
HW accelerator
Flash interface
Microphone
RF conn.
Vibra
RAPGSM
FM radio
µSD reader
Earpiece
Vol+
Vol-
SIM reader
RTC battery
Display flex
conn.
BT
Reminder
LEDs
Retu
Tahvo
XTI
Mini USB
2,5 AV conn.

System block diagram

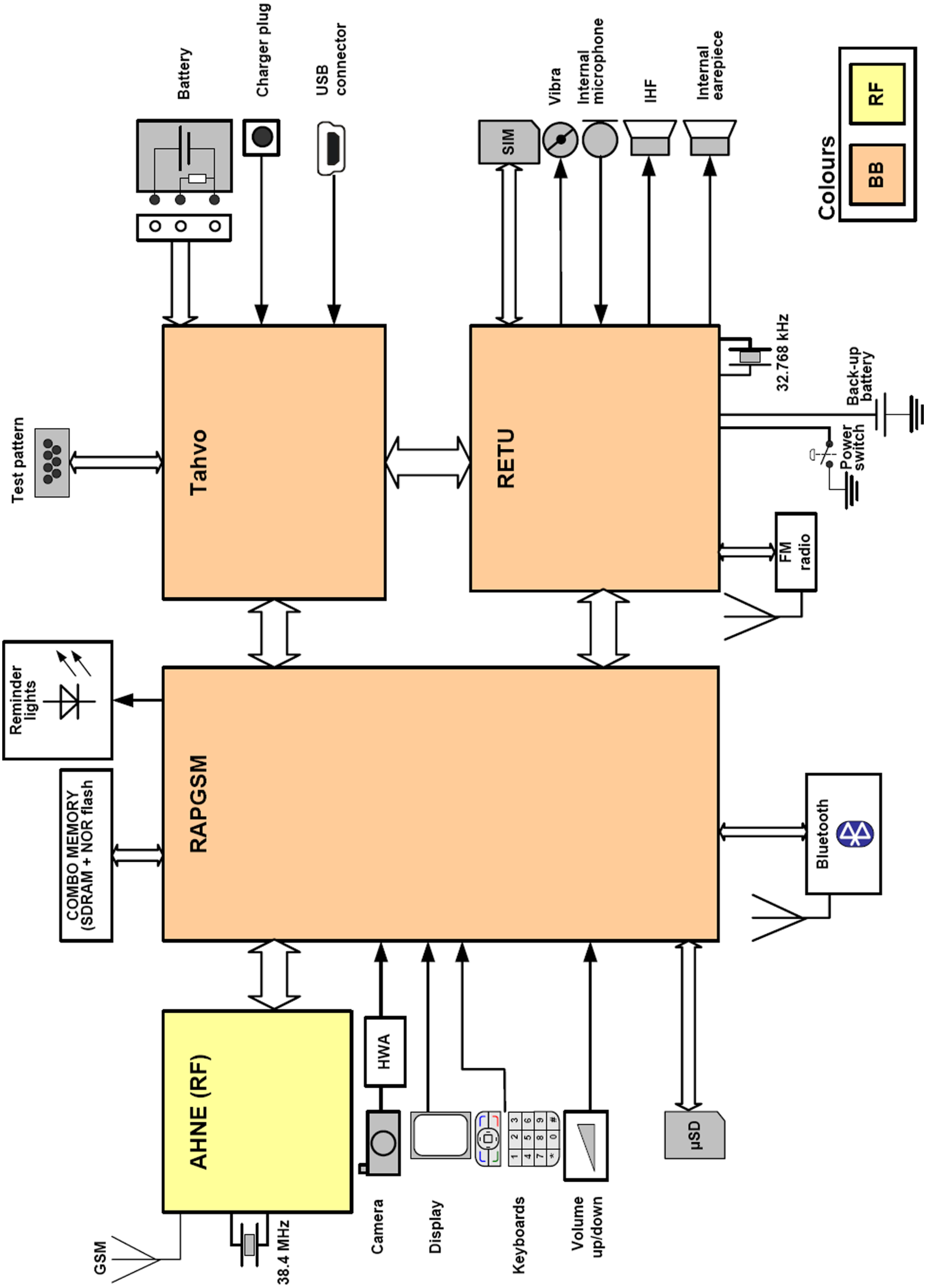

Battery
Charger plug
USB connector
SIM
Vibra
Internal microphone
IHF
Internal earpiece
Colours
BB
RF
Test pattern
Tahvo
RETU
32.768 kHz
Back-up battery
Power switch
FM radio
Reminder lights
COMBO MEMORY (SDRAM + NOR flash)
RAPGSM
Bluetooth
AHNE (RF)
HWA
µSD
GSM
38.4 MHz
Camera
Display
Keyboards
Volume up/down

Figure 51 System block diagram

Board and module connections

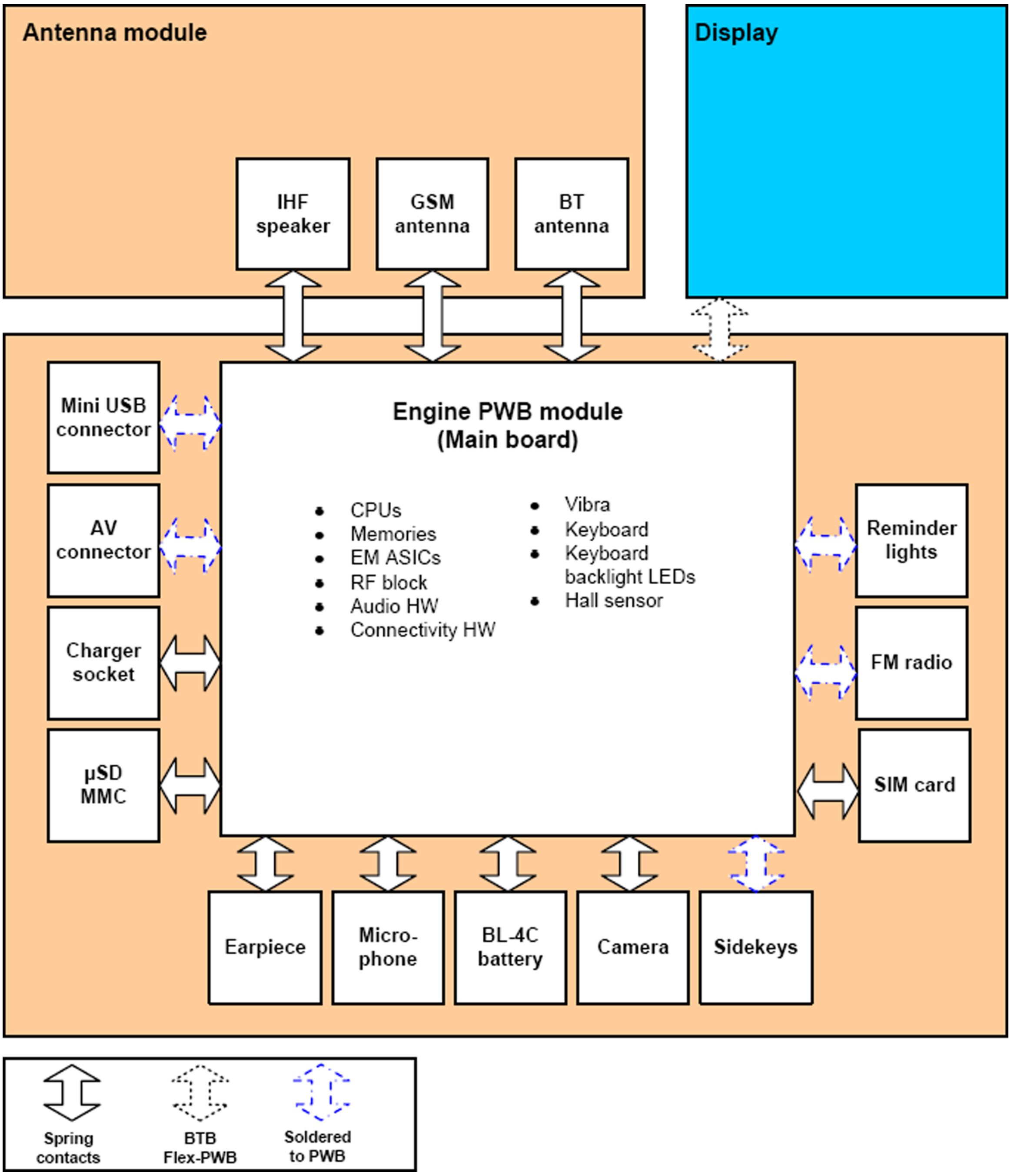

Antenna module
Display
IHF speaker
GSM antenna
BT antenna
Mini USB connector
AV connector
Charger socket
µSD MMC
Engine PWB module (Main board)
CPUs
Memories
EM ASICs
RF block
Audio HW
Connectivity HW
Vibra
Keyboard
Keyboard backlight LEDs
Hall sensor
Reminder lights
FM radio
SIM card
Earpiece
Micro-phone
BL-4C battery
Camera
Sidekeys
Spring contacts
BTB Flex-PWB
Soldered to PWB

Figure 52 Board and module connections

Engine

Engine modules

The engine contains

- RF module with Ahne ASIC
- Main processor with integrated memory (Baseband)
- Energy management - Retu and Tahvo (Baseband)

- SDRAM and NOR flash memories

RF engine

The RF module performs the high frequency operations of the engine for GSM. In both transmitter and receiver, the modulator and demodulator operate at the channel frequency.

The core components of the RF module are:

- Ahne RF ASIC (application specific integrated circuit)
- Front end module (FEM) module (Power amplifier and Antenna switch)

The RF engine also includes:

- Voltage controlled oscillators (VCO and VCTCXO)
- SAW filters

The baseband section controls the RF module through the serial bus, RFBus. This passes information about eg. frequency band and mode of operation. Ahne RF ASIC controls the mode of operation, and further sends control signals to the front end module.

In addition to the RFBus there are other interface signals for the power control loop, VCTCXO control and for the modulated waveforms.

Main processor

The main processor in this device is RAPGSM, a BB5.0 ASIC.

Some of its interfaces, processors and controllers are:

- General purpose UARTs
- Processor modules
- I2C (between ICs) interface
- GSM coder
- Interfaces to user interface, SIM and MMC
- Accessory interface
- Handling of RF-BB interface
- I/O voltage = 1.8 V, Core voltage <1.8 V

Energy management

Two ASICs manages the energy in the phone; Retu and Tahvo. Together they cover the analogue audio and energy management function needs.

Tahvo

All blocks that need a special silicon process are included in Tahvo.

Tahvos main features are:

- Energy management control
- Supply voltage generation
- Charge control
- Digital core supply
- Current control for LED supply

Retu

The blocks that do not have special needs are included in Retu.

Retu controls for example:

- Audio block
- SIM
- FM radio

Modes of operation

The functional behavior can be divided into seven different states. Each of these states will affect the general functionality of the phone:

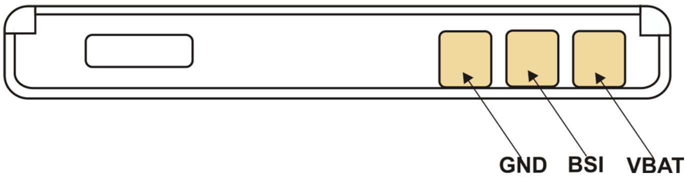
- No supply
- Backup
- Power off
- Reset
- Power on
- Deep sleep

Battery and charging

Battery

- Type: BL-4C, Li-Ion
- Capacity: 860 mAh
- BSI resistor nominal value: 75 kΩ

Battery temperature is measured on the NTC on the main board.



Battery connector

The battery connector has three poles:

- BSI (Battery size indicator)
- GND (Ground)
- VBAT (Battery voltage)

The BSI line is used to recognize the battery capacity by a battery internal pull down resistor.

Charging

This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The old standard charger (3.5 mm) can be used together with the CA-44 charger adapter.

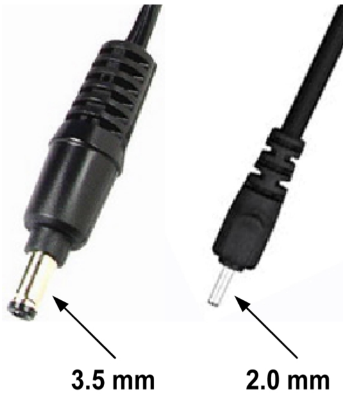


Figure 53 Old (left) and new (right) charger plugs

Charging is controlled by energy management, and external components are needed to protect the baseband module against EMC, reverse polarity and transient frequency deviation.

Interfaces

FM radio

This phone uses a single-chip electronically tuned FM stereo radio with low voltage application.

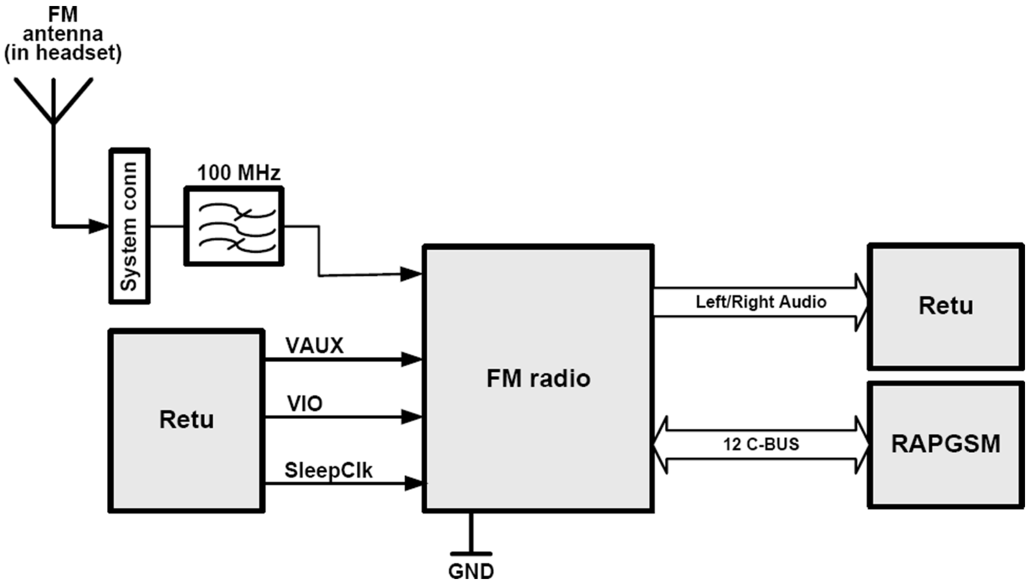
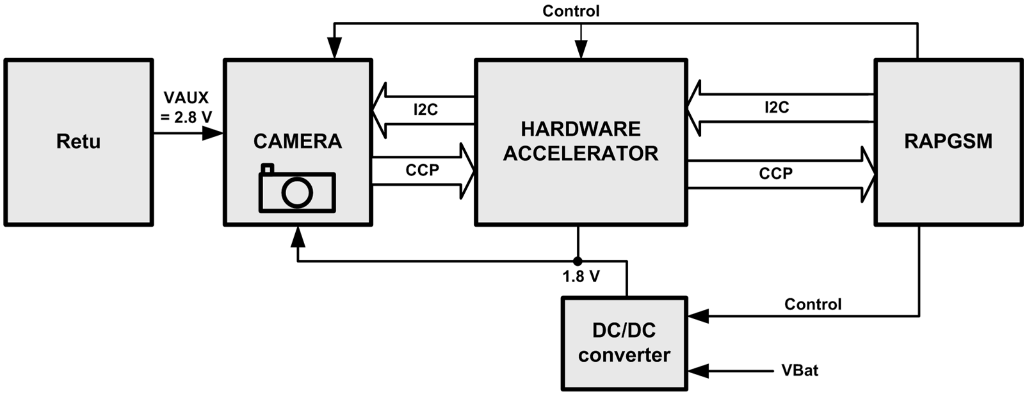

FM
antenna
(in headset)
System conn
100 MHz
Retu
VAUX
VIO
SleepClk
FM radio
GND
Left/Right Audio
Retu
12 C-BUS
RAPGSM

Figure 54 FM radio interface

Camera

Camera interface

The RM-217/222 has a **2.0 Megapixel** camera, supported by a hardware accelerator.


Control
Retu
VAUX = 2.8 V
CAMERA
I2C
CCP
HARDWARE ACCELERATOR
I2C
CCP
RAPGSM
1.8 V
Control
DC/DC converter
VBat

SIM

The SIM interface is the electrical interface between the SIM card and the mobile phone engine.

The data communication between the SIM card and the phone is asynchronous half duplex.

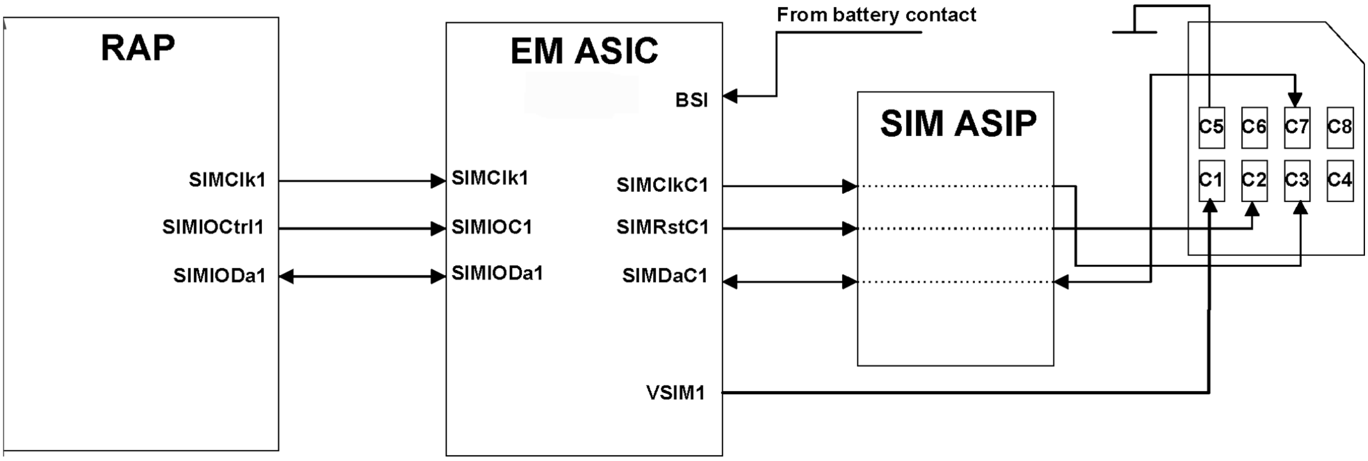

RAP
SIMClk1
SIMIOCtrl1
SIMIODa1
EM ASIC
SIMClk1
SIMIOC1
SIMIODa1
BSI
SIMClkC1
SIMRstC1
SIMDaC1
VSIM1
From battery contact
SIM ASIP
C5
C6
C7
C8
C1
C2
C3
C4

Figure 55 SIM interface connections

SIM Logic level shifting

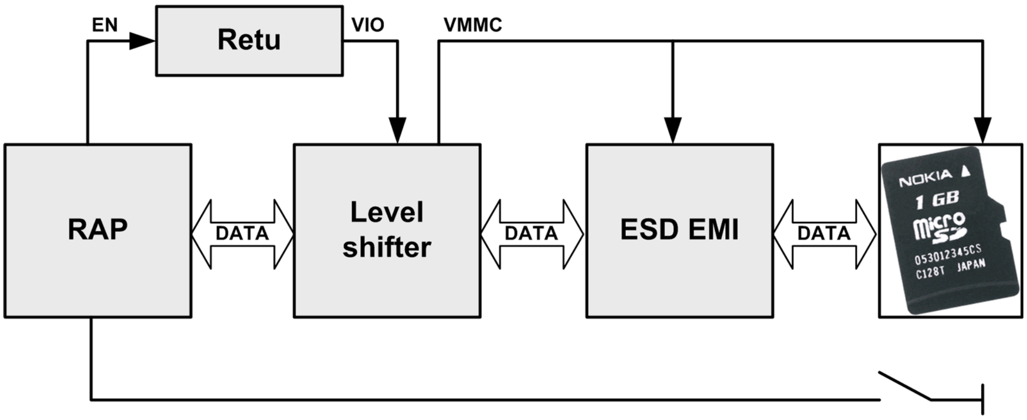
The SIM interface can support 3V and 1.8V SIM cards.

SIM Power up/down

The SIM power up/down sequence is generated in Retu. This means that Retu generates the reset switch (RST) signal to the SIM. In addition, the SIMCardDet signal is connected to Retu.

The SIM interface is powered up when the SIMCardDet signal indicates “card in”.

µSD card interface



The µSD card is connected to the engine by an external level shifter and ESD protection filter. Supplied voltages:

- VMMC: 2.85 V (from level shifter)
- VIO: 1.8 V (from Retu)

The card removal is detected by a push detect switch.

User interface

Display

The display unit comprises a parallel interface.

Keyboard

All keys are placed on the main PWB.

- Numeric keys
- Navigation key, Soft keys, Start, and End
- Power switch
- Volume up and down switch

Display and keypad backlight

There are two sets of LEDs illuminating the display and the keypads:

- Display LEDs, 4pcs
- Main keypad on PWB, 4 pcs, white colour

All sets share the same driver. None of the keypads can be illuminated without the LCD backlight being turned on.

Reminder lights

Two additional blue LEDs serve as reminder lights for missed calls/text messages.

Audio concept

Audio concept

The functional core of the audio hardware is built around two ASICs; RAP engine and Retu.

Retu provides an interface for the trancducers and the AV connector.

There are three audio transducers:

- 1 dynamic earpiece
- 1 dynamic speaker
- 1 microphone module

Retu also provides an output for the vibra motor.

All external audio accessories are connected to the specific audio connector.

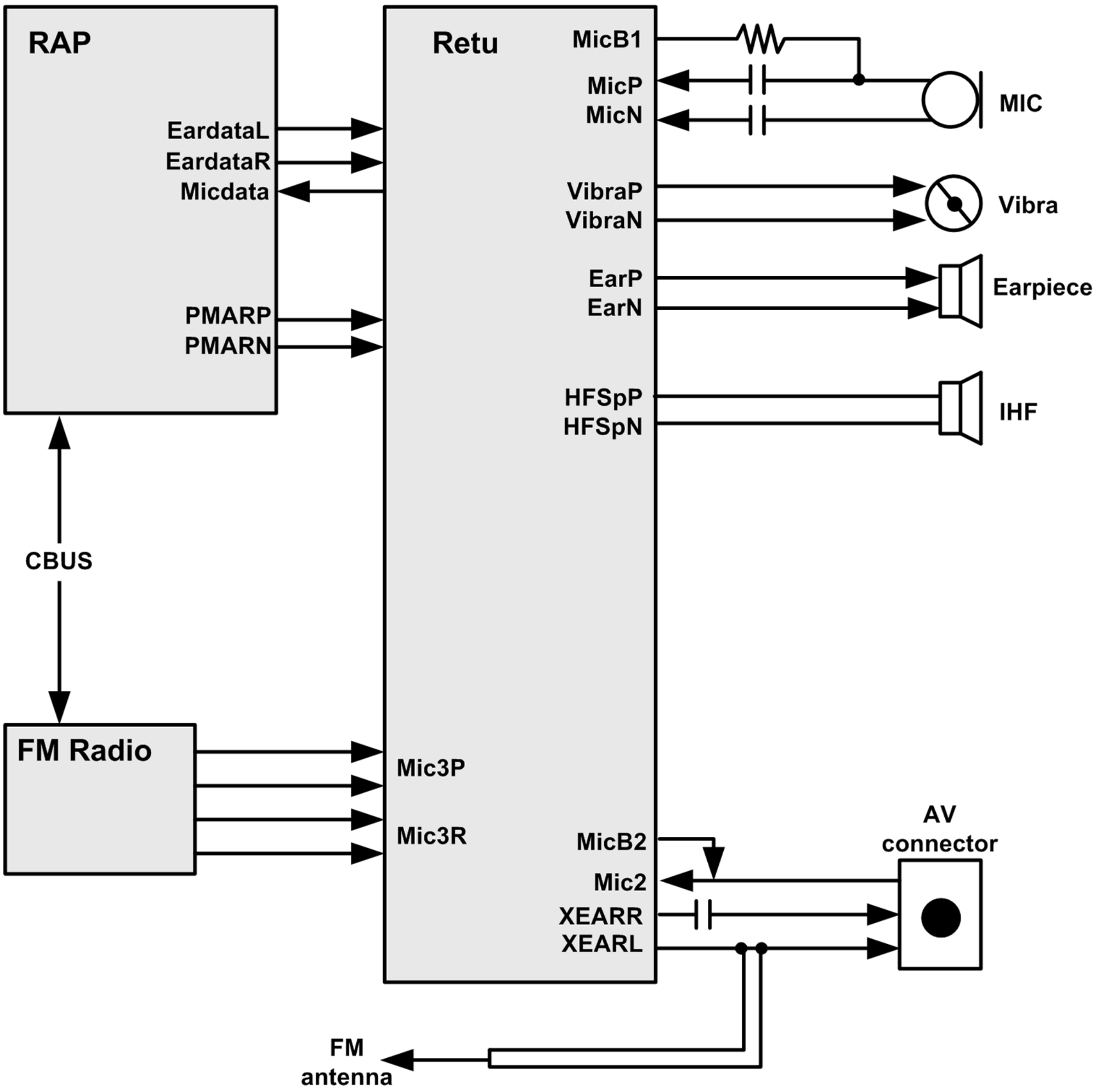

RAP
EardataL
EardataR
Micdata
PMARP
PMARN
Retu
MicB1
MicP
MicN
VibraP
VibraN
EarP
EarN
HFSpP
HFSpN
MIC
Vibra
Earpiece
IHF
CBUS
FM Radio
Mic3P
Mic3R
MicB2
Mic2
XEARR
XEARL
AV
connector
FM
antenna

Figure 56 Audio block diagram

Internal audio

The internal audio components are used in these modes:

	Hand portable (HP) mode	Internal hands free (IHF) mode
Microphone	X	X
Earpiece	X	
Speaker		X

Connections

AV connector

Headsets and other galvanic accessories are connected to the specific audio input. The accessory mode is automatically enabled/disabled when a dedicated accessory is connected/disconnected.

> **Note:** When testing external audio through the audio connector, make sure that the specific accessory can be used with this phone!

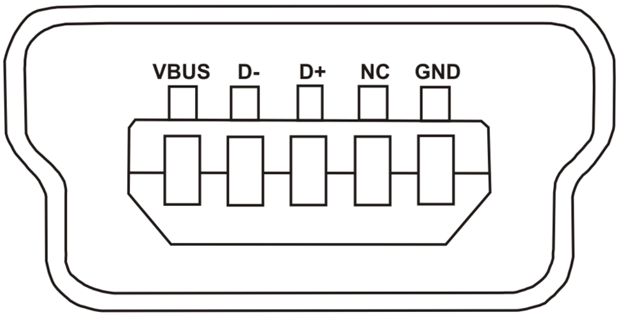
USB

USB (Universal Serial Bus) provides a wired connectivity between a PC and peripheral devices. It is a differential serial bus.

USB 2.0 is supported with full speed (12 Mbps).

Hot swap is supported, which means that USB devices may be plugged in/out at any time.

This phone is provided with a specific connector for mini USB.


VBUS
D-
D+
NC
GND

Bluetooth

Bluetooth provides a fully digital link for communication between a master unit and one or more slave units.

This bluetooth solution is a single chip solution.

Bluetooth connects to RAPGSM on the GENIO and GPIO busses.

The Bluetooth module is provided with power from VBat.

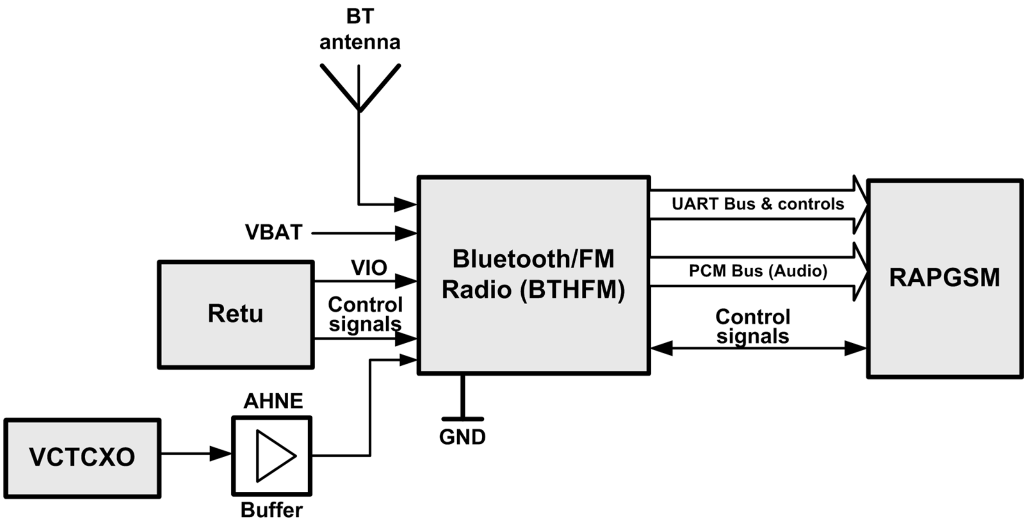

BT
antenna
VBAT
VIO
Control
signals
Retu
Bluetooth/FM
Radio (BTHFM)
UART Bus & controls
PCM Bus (Audio)
Control
signals
RAPGSM
AHNE
VCTCXO
Buffer
GND

Figure 57 Bluetooth interface block diagram

Technical specifications

General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-4C 860 mAh Li-Ion battery pack	106,8 x 43,8 x 13,1	91	55,6

Battery endurance

Battery	Talk time	Standby time	Music time
BL-4C 860 mAh Li-ion	3 - 3.5 hours	Up to 300 hours	> 10 hours

Note: Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active, and reduced by 5% if enhanced full rate is active.

Environmental conditions

Temperature

Temperature range	Min ºC	Max ºC
Operational (all specs met)	-5	+55
Functional (reduced performance)	-30	+70
Storage	-30	+85

The HW module complies with the SPR4 Operating Conditions.

Humidity

Relative humidity range is 5...95%.

The hardware module is not protected against water. Condensed or splashed water might cause malfunction. Any submerge of the phone will cause permanent damage. Long-term high humidity, with condensation, will cause permanent damage because of corrosion.

The hardware module complies with the SPR4 Operating Conditions.

Electrical characteristics

Table 13 Normal and extreme voltages

Voltage	Voltage (V)	Condition
General conditions		
Nominal voltage	3.7	
Lower extreme voltage	3.06	a

Voltage	Voltage (V)	Condition
Higher extreme voltage	4.2	b

a. ADC settings in the SW might shutdown the phone above this value.

b. During fast charging of an empty battery, this voltage might exceed this value. Voltages between 4.20 and 4.60 might appear for a short while.

Main RF characteristics

Table 14 Channel numbers and frequencies

System	Channel number	TX frequency	RX frequency	Unit
GSM850	128 <= n <= 251	F = 824.2 + 0.2*(n - 128)	F = 869.2 + 0.2*(n-128)	MHz
GSM900	0 < =n <= 124	F = 890 + 0.2*n	F = 935 + 0.2*n	MHz
	975 <= n <= 1023	F = 890 + 0.2* (n - 1024)	F = 935 + 0.2*(n -1024)	MHz
GSM1800	512 <= n <= 885	F = 1710.2 + 0.2* (n - 512)	F = 1805.2 + 0.2*(n-512)	MHz
GSM1900	512 <= n <= 810	F = 1850.2 + 0.2* (n - 512)	F = 1930.2 + 0.2*(n-512)	MHz

Table 15 Main RF characteristics

Parameter	Unit and value
Cellular systems	**RM-217**: EGSM900/GSM1800/GSM1900 **RM-222**: GSM850/GSM1800/GSM1900
RX Frequency range	GSM850: 869 ... 894 MHz
	EGSM900: 925 ... 960 MHz
	GSM1800: 1805...1880 MHz
	GSM1900: 1930...1990 MHz
TX Frequency range	GSM850: 824 ... 849 MHz
	EGSM900: 880 ... 915 MHz
	GSM1800: 1710 ...1785 MHz
	GSM1900: 1850...1910 MHz
Duplex spacing	GSM850: 45 MHz
	EGSM900: 45 MHz
	GSM1800: 95 MHz
	GSM1900: 80 MHz
Channel spacing	200 kHz

Parameter	Unit and value
Number of RF channels	GSM850: 124
	EGSM900: 174
	GSM1800: 374
	GSM1900: 300
Output Power	GSM850: GSMK 5...33 dBm
	GSM850: 8-PSK 5...26.5 dBm
	EGSM900: GSMK 5...33 dBm
	EGSM900: 8-PSK 5...26.5 dBm
	GSM1800: GSMK 0...30 dBm
	GSM1800: 8-PSK 0...25.5 dBm
	GSM1900: GSMK 0...30 dBm
	GSM1900: 8-PSK 0...25.5 dBm
Number of power levels GMSK	GSM850: 15
	EGSM900: 15
	GSM1800: 16
	GSM1900: 16
Number of power levels 8-PSK	GSM850: 12
	EGSM900: 12
	GSM1800: 14
	GSM1900: 14

Table 16 Transmitter characteristics

Item	Values
Type	Direct conversion, nonlinear, FDMA/TDMA
LO frequency range	GSM850: 3296...3576 MHz (4 x TX freq)
	EGSM900: 3520...3660 MHz (4 x TX freq)
	GSM1800: 3420...3570 MHz (2 x TX freq)
	GSM1900: 3700...3820 MHz (2 x TX freq)
Output power (GSM850/EGSM900/GSM1800/ GSM1900)	GMSK 33/33/30/30 dBm 8-PSK 26.5/26.5/25.5/25.5 dBm
Gain control range	min. 30 dB
Phase error (RMS/peak), GMSK	5 deg./20 deg. peak
EVM (RMS/peak), 8-PSK	10%/30%

Table 17 Receiver characteristics

Item	Values
Type	Direct conversion, Linear, FDMA/TDMA
LO frequencies	GSM850: 3476..3576 MHz (4 x RX freq)
	EGSM900: 3700...3840 MHz (4 x RX freq)
	GSM1800: 3610...3760 MHz (2 x RX freq)
	GSM1900: 3860...3980 MHz (2 x RX freq)
Typical 3 dB bandwidth	+/- 91 kHz
Sensitivity	min. - 102 dBm (normal condition)
Total typical receiver voltage gain (from antenna to RX ADC)	86 dB
Receiver output level (RF level -95 dBm)	40 mVpp, single-ended I/Q signals to RX ADCs

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9 — Schematics

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TAHVO 9–6
RAPGSM, Combo, microSD 9–7
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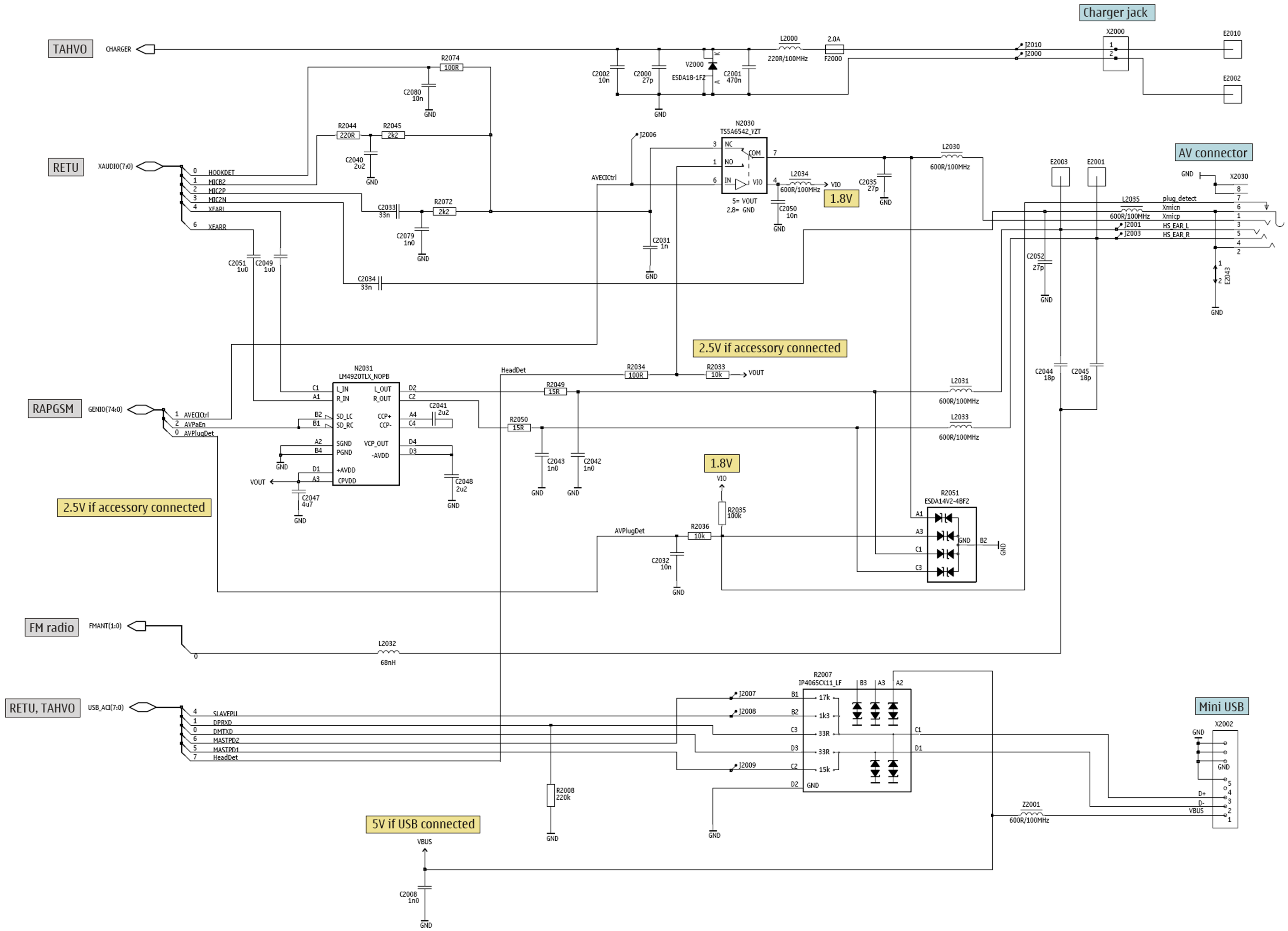
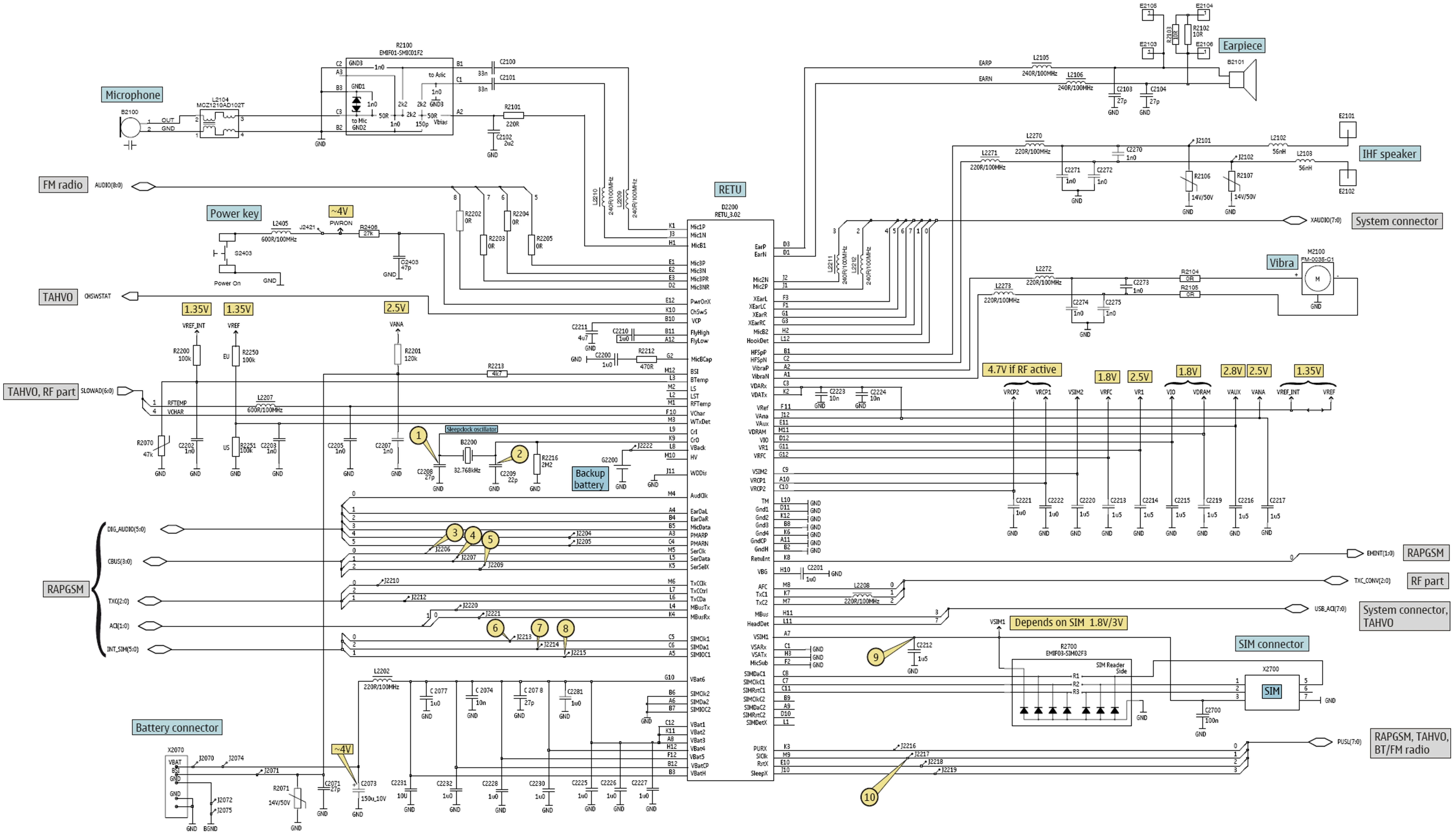
Camera 9–10
RF part 9–11
Signal overview 9–12
Component finder 9–13

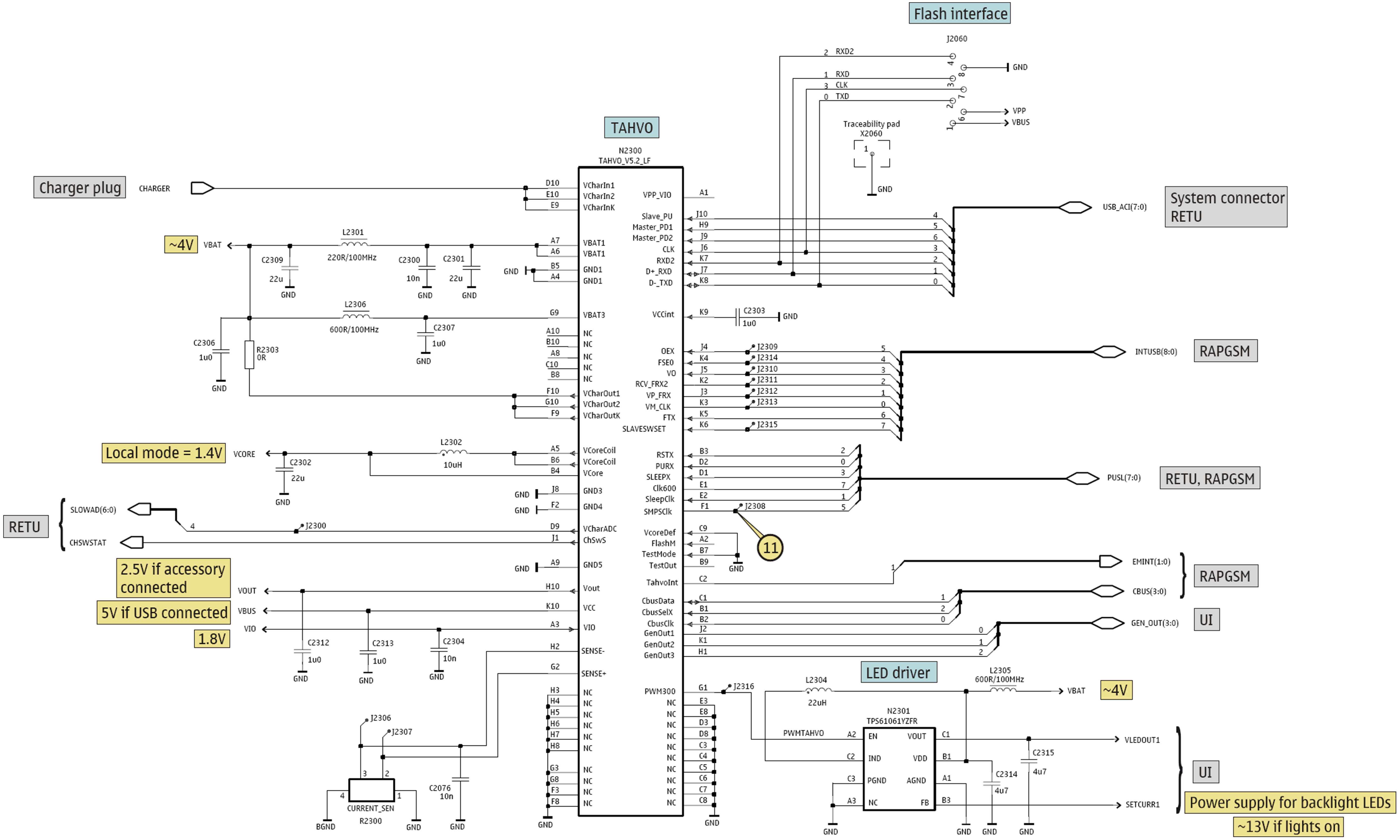
AV connector, mini USB, charger jack


Charger jack
TAHVO
CHARGER
R2074
100R
C2080
10n
L2000
220R/100MHz
2.0A
F2000
J2010
J2000
X2000
E2010
E2002
C2002
10n
C2000
27p
V2000
ESDA18-1F2
C2001
470n
GND
RETU
XAUDIO(7:0)
HOOKDET
MICB2
MIC2P
MIC2N
XEARL
XEARR
R2044
220R
R2045
2k2
C2040
2u2
C2033
33n
R2072
2k2
C2079
1n0
C2051
1u0
C2049
1u0
C2034
33n
J2006
AVECICtrl
N2030
TS5A6542_YZT
NC
COM
NO
IN
VIO
5= VOUT
2,8= GND
L2034
600R/100MHz
VIO
1.8V
C2035
27p
C2050
10n
C2031
1n
L2030
600R/100MHz
E2003
E2001
AV connector
X2030
L2035
600R/100MHz
plug_detect
Xmicn
Xmicp
HS_EAR_L
HS_EAR_R
J2001
J2003
C2052
27p
E2043
2.5V if accessory connected
RAPGSM
GENIO(74:0)
AVECICtrl
AVPaEn
AVPlugDet
N2031
LM4920TLX_NOPB
L_IN
R_IN
L_OUT
R_OUT
SD_LC
SD_RC
CCP+
CCP-
SGND
PGND
VCP_OUT
-AVDD
+AVDD
CPVDD
C2041
2u2
C2048
2u2
C2047
4u7
VOUT
HeadDet
R2034
100R
R2033
10k
VOUT
R2049
15R
R2050
15R
C2043
1n0
C2042
1n0
L2031
600R/100MHz
L2033
600R/100MHz
C2044
18p
C2045
18p
1.8V
VIO
R2035
100k
AVPlugDet
R2036
10k
C2032
10n
R2051
ESDA14V2-4BF2
2.5V if accessory connected
FM radio
FMANT(1:0)
L2032
68nH
RETU, TAHVO
USB_ACI(7:0)
SLAVEPU
DPRXD
DMTXD
MASTPD2
MASTPD1
HeadDet
R2007
IP4065CX11_LF
J2007
J2008
J2009
17k
1k3
33R
33R
15k
R2008
220k
Mini USB
X2002
D+
D-
VBUS
Z2001
600R/100MHz
5V if USB connected
VBUS
C2008
1n0

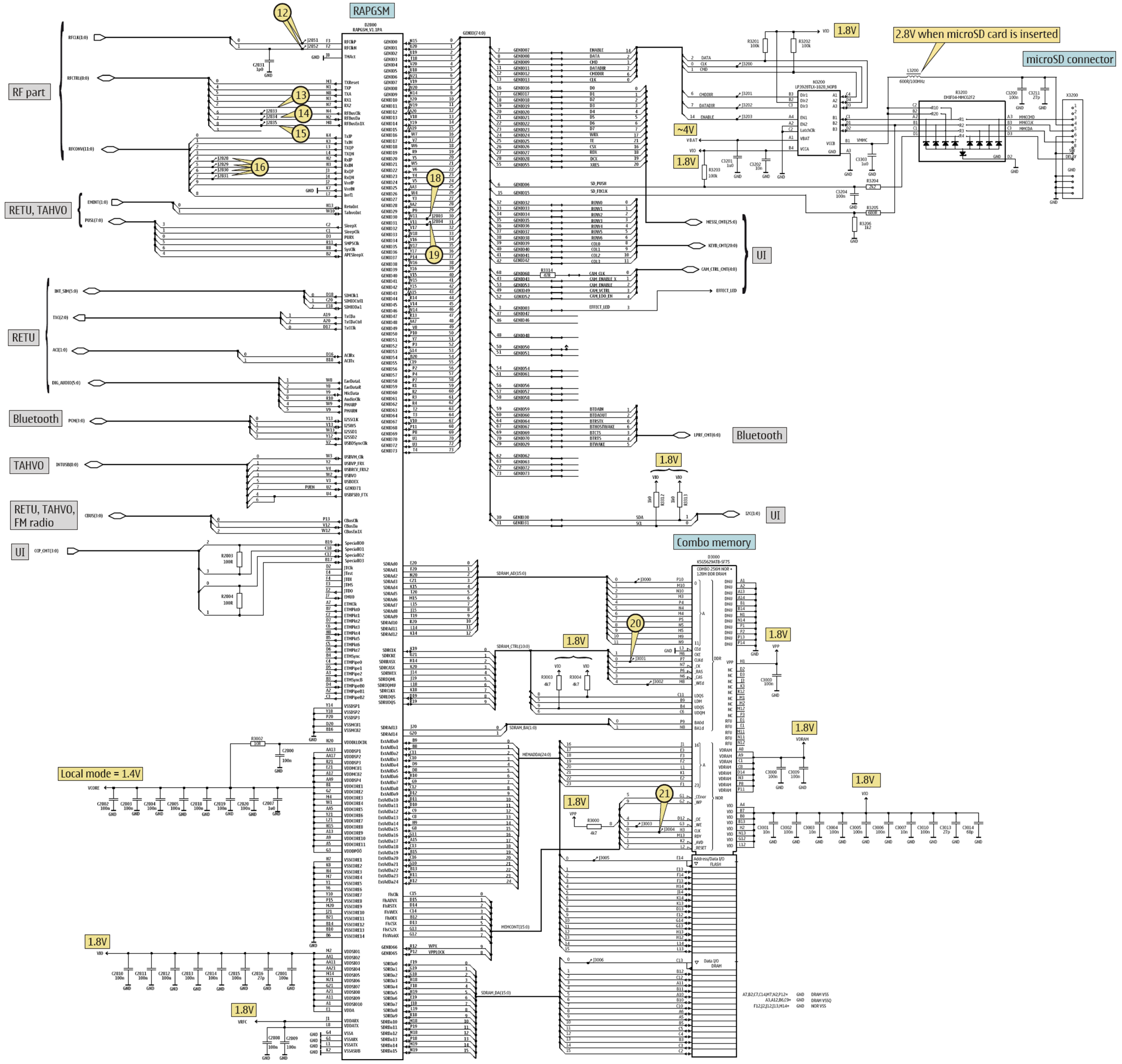
RETU, SIM, Audio


Microphone
B2100
L2104
MOZ1210AD102T
R2100
EMIF01-SMIC01F2
C2100
C2101
R2101
220R
C2102
2u2
FM radio
AUDIO(8:0)
Power key
~4V
PWRON
R2408
27k
S2403
Power On
C2403
47p
L2405
600R/100MHz
TAHVO
CHSWSTAT
1.35V
1.35V
2.5V
VREF_INT
VREF
VANA
R2200
100k
R2250
100k
R2201
120k
TAHVO, RF part
SLOWAD(6:0)
RFTEMP
VCHAR
L2207
600R/100MHz
R2070
47k
Sleepclock oscillator
B2200
32.768kHz
C2208
27p
C2209
22p
R2216
2M2
Backup battery
G2200
RETU
D2200
RETU_3.02
DIG_AUDIO(5:0)
CBUS(3:0)
RAPGSM
TXC(2:0)
ACI(1:0)
INT_SIM(5:0)
1
2
3
4
5
6
7
8
9
10
L2202
220R/100MHz
Battery connector
X2070
VBAT
BSI
GND
~4V
C2073
150u_10V
R2071
14V/50V
Earpiece
E2105
E2104
E2103
E2106
R2102
10R
R2103
10R
B2101
L2105
240R/100MHz
L2106
240R/100MHz
C2103
27p
C2104
27p
EARP
EARN
IHF speaker
E2101
E2102
L2270
220R/100MHz
L2271
220R/100MHz
L2102
56nH
L2103
56nH
R2106
14V/50V
R2107
14V/50V
System connector
XAUDIO(7:0)
Vibra
M2100
FM-0035-C1
R2104
0R
R2105
0R
L2272
220R/100MHz
L2273
220R/100MHz
4.7V if RF active
1.8V
2.5V
1.8V
2.8V
2.5V
1.35V
VRCP2
VRCP1
VSIM2
VRFC
VR1
VIO
VDRAM
VAUX
VANA
VREF_INT
VREF
RAPGSM
EMINT(1:0)
RF part
TXC_CONV(2:0)
System connector, TAHVO
USB_ACI(7:0)
VSIM1
Depends on SIM 1.8V/3V
SIM connector
R2700
EMIF03-SIM02F3
SIM Reader Side
X2700
SIM
C2700
100n
C2212
1u5
L2208
220R/100MHz
RAPGSM, TAHVO, BT/FM radio
PUSL(7:0)

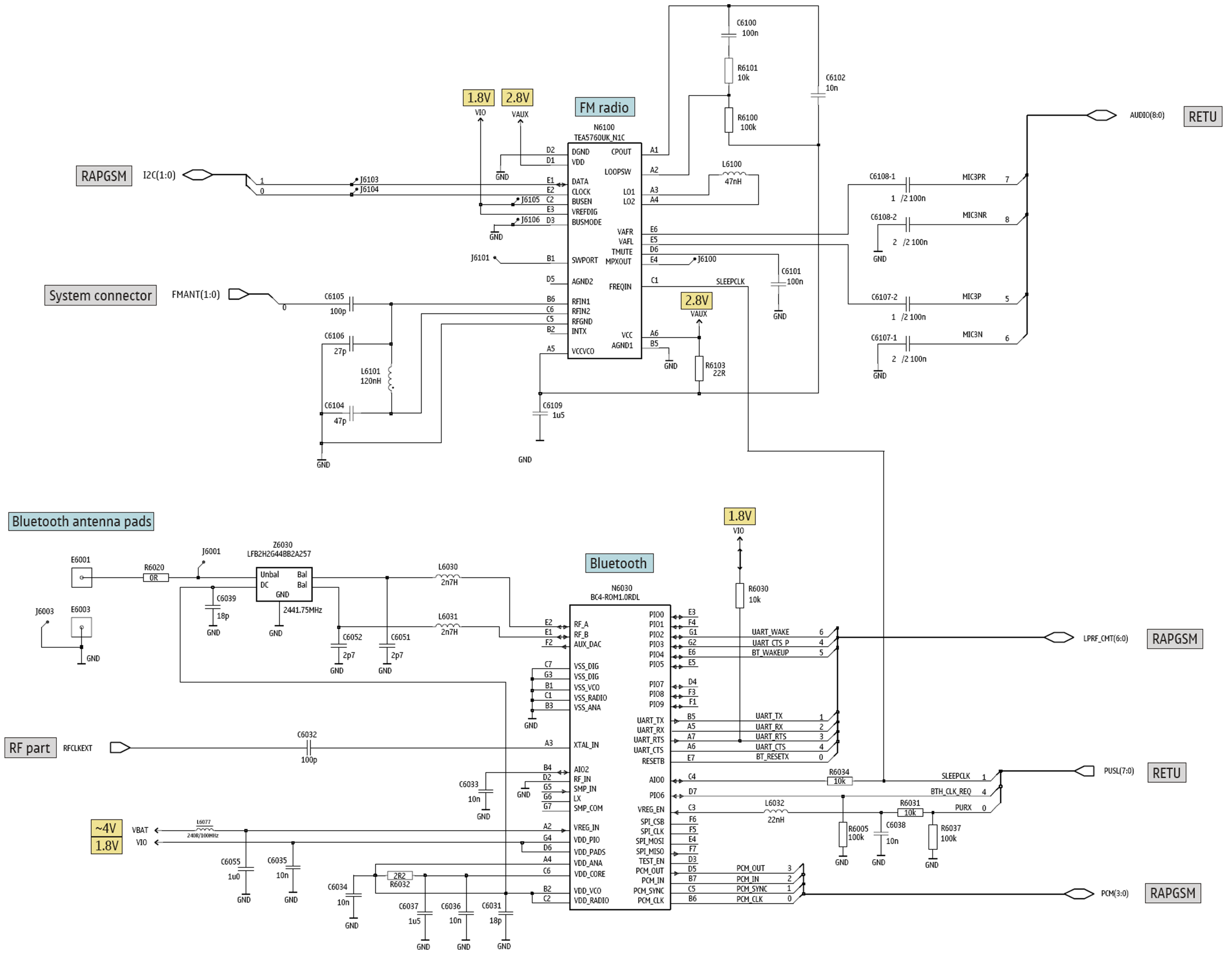
TAHVO


Flash interface
J2060
RXD2
GND
RXD
CLK
TXD
VPP
VBUS
Traceability pad
X2060
GND
TAHVO
N2300
TAHVO_V5.2_LF
Charger plug
CHARGER
VChargIn1
VChargIn2
VChargInK
VPP_VIO
System connector
RETU
USB_ACI(7:0)
Slave_PU
Master_PD1
Master_PD2
CLK
RXD2
D+_RXD
D-_TXD
~4V
VBAT
L2301
220R/100MHz
C2309
22u
C2300
10n
C2301
22u
GND
VBAT1
GND1
L2306
600R/100MHz
C2307
1u0
VBAT3
VCCint
C2303
1u0
C2306
R2303
0R
NC
OEX
FSE0
VO
RCV_FRX2
VP_FRX
VM_CLK
FTX
SLAVESWSET
J2309
J2314
J2310
J2311
J2312
J2313
J2315
INTUSB(8:0)
RAPGSM
VChargOut1
VChargOut2
VChargOutK
Local mode = 1.4V
VCORE
L2302
10uH
C2302
22u
VCoreCoil
VCore
RSTX
PURX
SLEEPX
Clk600
SleepClk
SMPSClk
J2308
PUSL(7:0)
RETU, RAPGSM
GND3
GND4
RETU
SLOWAD(6:0)
CHSWSTAT
J2300
VChargADC
ChSwS
VcoreDef
FlashM
TestMode
TestOut
11
2.5V if accessory connected
GND5
TahvoInt
EMINT(1:0)
RAPGSM
VOUT
Vout
5V if USB connected
VBUS
VCC
CbusData
CbusSelX
CbusClk
CBUS(3:0)
1.8V
VIO
GenOut1
GenOut2
GenOut3
GEN_OUT(3:0)
UI
C2312
1u0
C2313
1u0
C2304
10n
SENSE-
SENSE+
LED driver
PWM300
J2316
L2304
22uH
L2305
600R/100MHz
VBAT
~4V
N2301
TPS61061YZFR
PWMTAHVO
EN
VOUT
IND
VDD
PGND
AGND
FB
C2315
4u7
C2314
4u7
VLEDOUT1
SETCURR1
UI
Power supply for backlight LEDs
~13V if lights on
J2306
J2307
CURRENT_SEN
R2300
BGND
C2076
10n

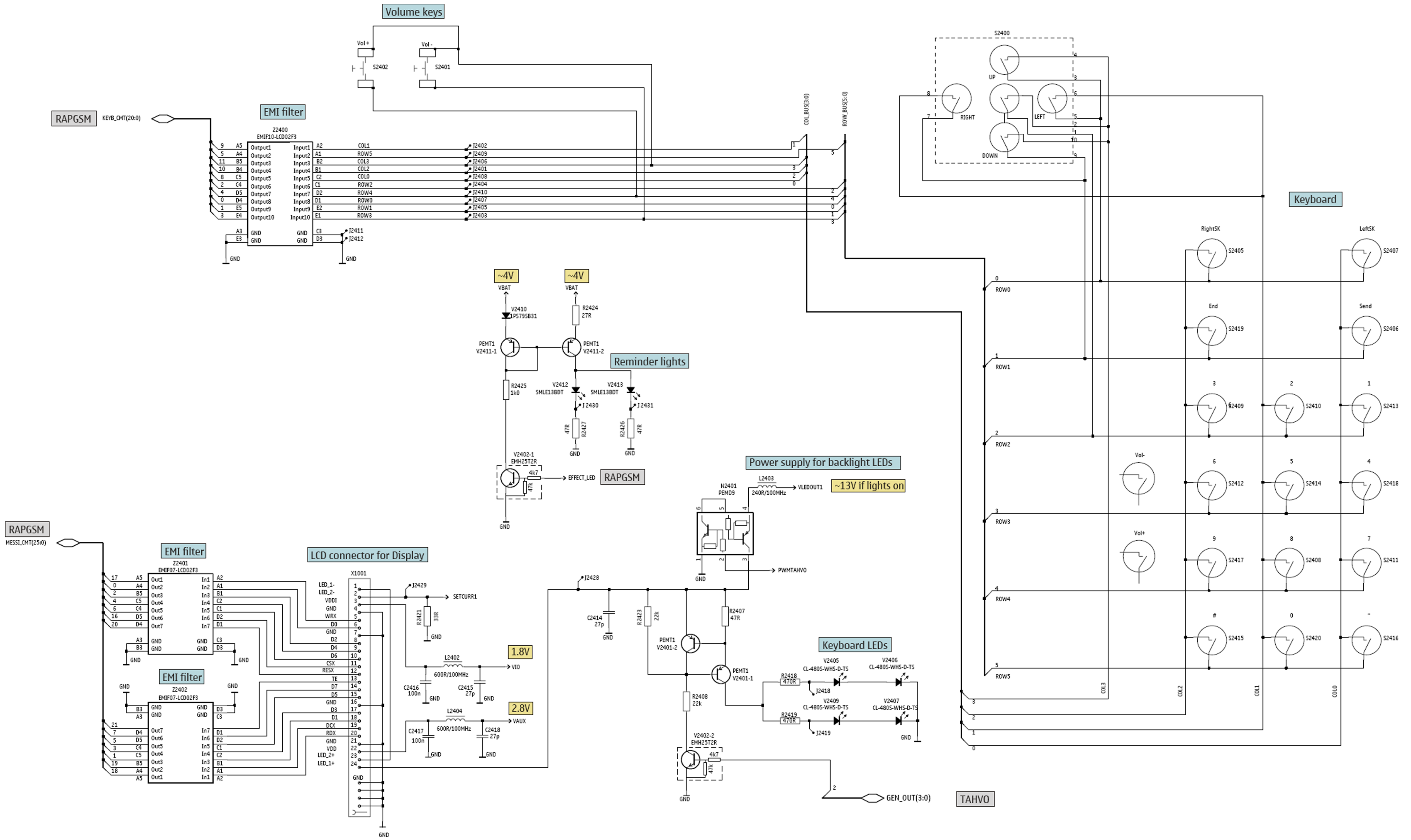
RAPGSM, Combo, microSD


RAPGSM
12
13
14
15
16
18
19
20
21
RF part
RETU, TAHVO
RETU
Bluetooth
TAHVO
RETU, TAHVO,
FM radio
UI
Local mode = 1.4V
1.8V
1.8V
1.8V
2.8V when microSD card is inserted
microSD connector
~4V
1.8V
UI
UI
Bluetooth
1.8V
UI
Combo memory
1.8V
1.8V
1.8V
1.8V
1.8V

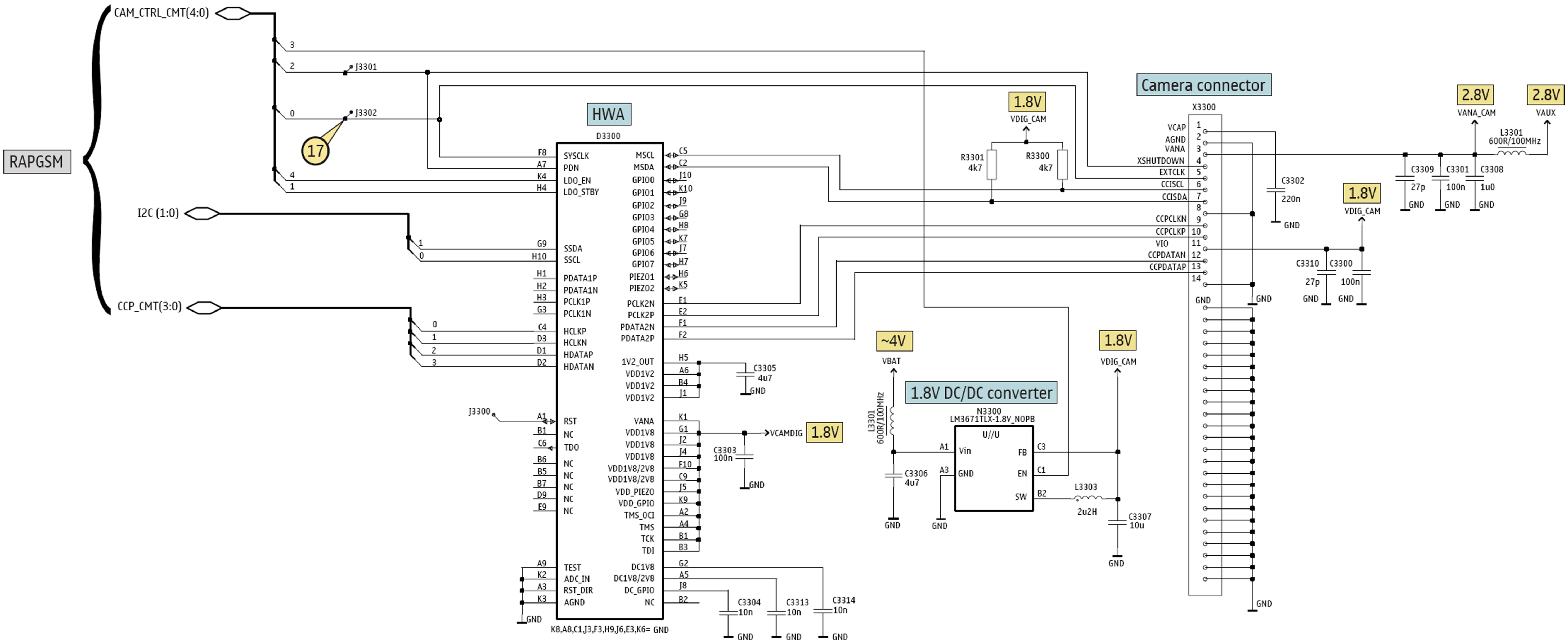
FM radio, Bluetooth


FM radio
N6100
TEA5760UK_N1C
1.8V
VIO
2.8V
VAUX
RAPGSM
I2C(1:0)
J6103
J6104
J6105
J6106
J6101
DGND
VDD
DATA
CLOCK
BUSEN
VREFDIG
BUSMODE
SWPORT
AGND2
RFIN1
RFIN2
RFGND
INTX
VCCVCO
CPOUT
LOOPSW
LO1
LO2
VAFR
VAFL
TMUTE
MPXOUT
FREQIN
VCC
AGND1
C6100
100n
R6101
10k
R6100
100k
C6102
10n
L6100
47nH
J6100
SLEEPCLK
C6101
100n
R6103
22R
C6109
1u5
System connector
FMANT(1:0)
C6105
100p
C6106
27p
L6101
120nH
C6104
47p
GND
RETU
AUDIO(8:0)
C6108-1
C6108-2
C6107-2
C6107-1
/2 100n
MIC3PR
MIC3NR
MIC3P
MIC3N
Bluetooth antenna pads
E6001
E6003
J6003
J6001
R6020
0R
Z6030
LFB2H2G44BB2A257
Unbal
DC
Bal
GND
2441.75MHz
C6039
18p
L6030
2n7H
L6031
2n7H
C6052
2p7
C6051
2p7
Bluetooth
N6030
BC4-ROM1.0RDL
R6030
10k
RF_A
RF_B
AUX_DAC
VSS_DIG
VSS_VCO
VSS_RADIO
VSS_ANA
XTAL_IN
AIO2
RF_IN
SMP_IN
LX
SMP_COM
VREG_IN
VDD_PIO
VDD_PADS
VDD_ANA
VDD_CORE
VDD_VCO
VDD_RADIO
PIO0
PIO1
PIO2
PIO3
PIO4
PIO5
PIO7
PIO8
PIO9
UART_TX
UART_RX
UART_RTS
UART_CTS
RESETB
AIO0
PIO6
VREG_EN
SPI_CSB
SPI_CLK
SPI_MOSI
SPI_MISO
TEST_EN
PCM_OUT
PCM_IN
PCM_SYNC
PCM_CLK
UART_WAKE
UART_CTS_P
BT_WAKEUP
BT_RESETX
LPRF_CMT(6:0)
RF part
RFCLKEXT
C6032
100p
C6033
10n
~4V
VBAT
L6077
240R/100MHz
C6055
1u0
C6035
10n
C6034
10n
2R2
R6032
C6037
1u5
C6036
10n
C6031
18p
R6034
10k
SLEEPCLK
BTH_CLK_REQ
PURX
PUSL(7:0)
L6032
22nH
R6031
10k
R6005
100k
C6038
10n
R6037
100k
PCM(3:0)

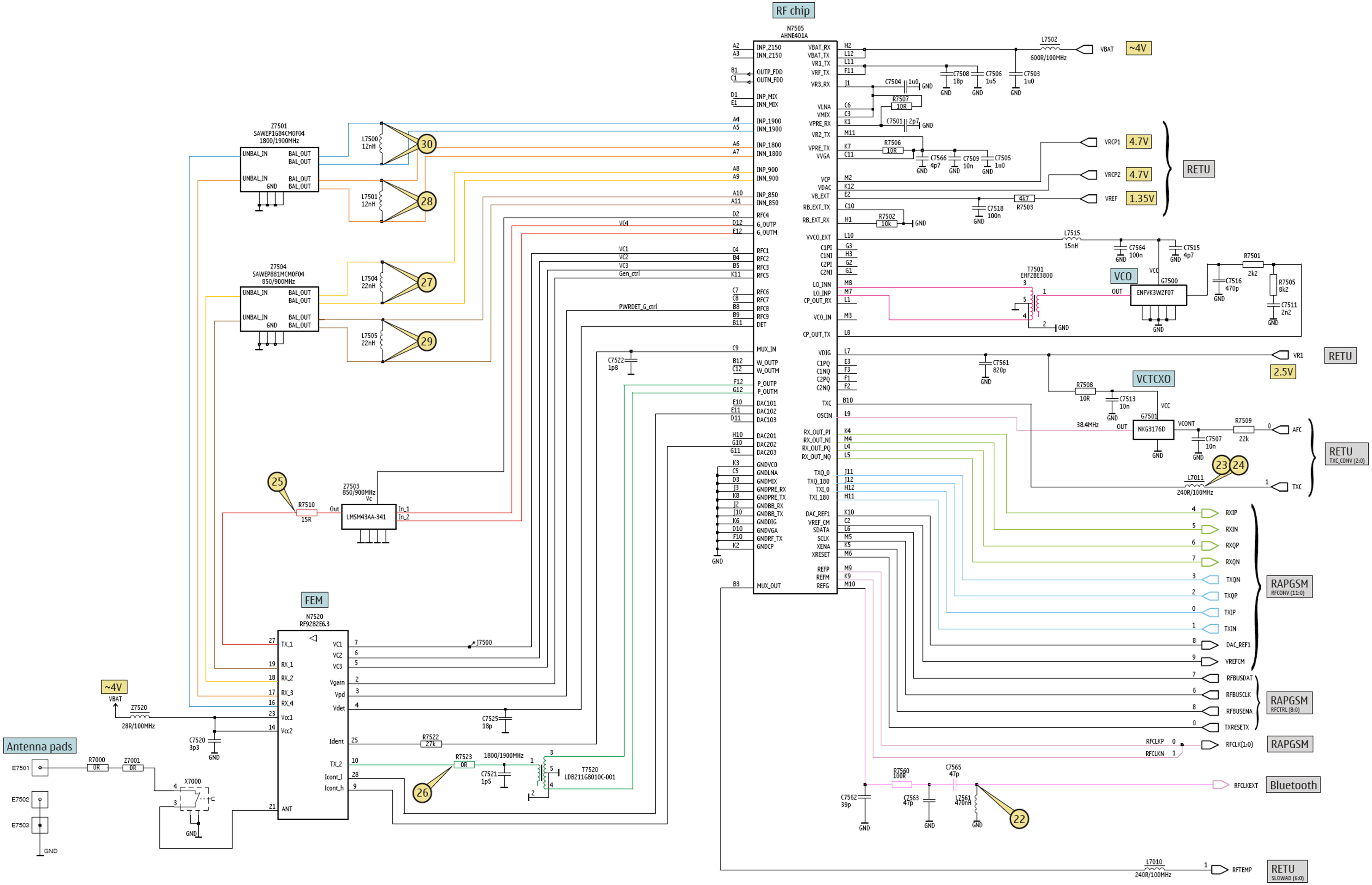
User interface


Volume keys
Vol +
Vol -
S2402
S2401
RAPGSM
KEYB_CMT(20:0)
EMI filter
Z2400
EMIF10-LCD02F3
COL_BUS(3:0)
ROW_BUS(5:0)
S2400
UP
RIGHT
LEFT
DOWN
Keyboard
RightSK
LeftSK
S2405
S2407
End
Send
S2419
S2406
S2409
S2410
S2413
S2412
S2414
S2418
S2417
S2408
S2411
S2415
S2420
S2416
Vol-
Vol+
ROW0
ROW1
ROW2
ROW3
ROW4
ROW5
COL3
COL2
COL1
COL0
~4V
VBAT
V2410
1PS79SB31
R2424
27R
PEMT1
V2411-1
V2411-2
Reminder lights
R2425
1k0
V2412
SMLE13BDT
V2413
J2430
J2431
R2427
R2426
47R
V2402-1
EMH25T2R
4k7
47k
EFFECT_LED
RAPGSM
Power supply for backlight LEDs
N2401
PEMD9
L2403
240R/100MHz
VLEDOUT1
~13V if lights on
PWMTAHVO
RAPGSM
MESSI_CMT(25:0)
EMI filter
Z2401
EMIF07-LCD02F3
LCD connector for Display
X1001
J2429
SETCURR1
R2421
33R
L2402
600R/100MHz
1.8V
VIO
C2416
100n
C2415
27p
L2404
2.8V
VAUX
C2417
100n
C2418
27p
EMI filter
Z2402
EMIF07-LCD02F3
J2428
C2414
27p
R2423
22k
R2407
47R
PEMT1
V2401-2
V2401-1
Keyboard LEDs
R2418
470R
J2418
V2405
CL-480S-WHS-D-TS
V2406
V2409
V2407
R2419
J2419
R2408
22k
V2402-2
EMH25T2R
GEN_OUT(3:0)
TAHVO
GND

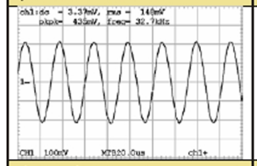
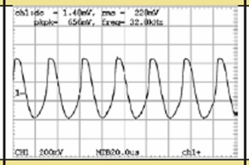
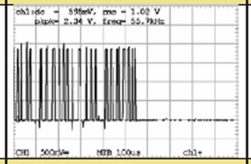
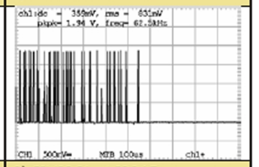
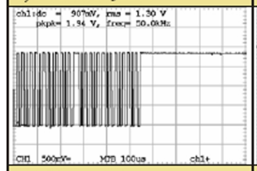
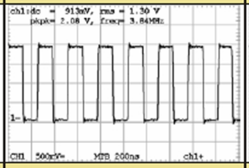
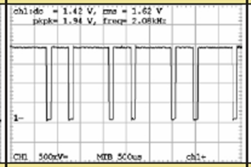
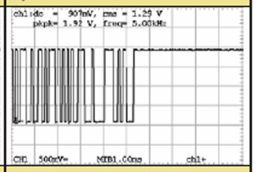
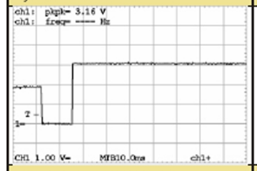
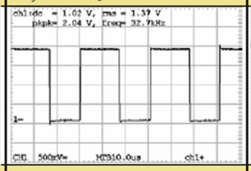
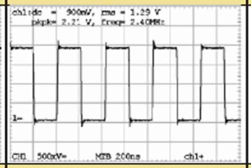
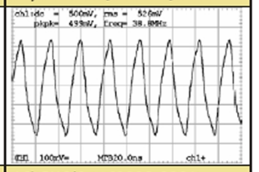
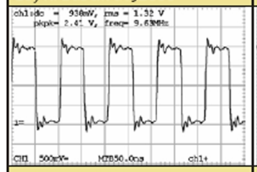
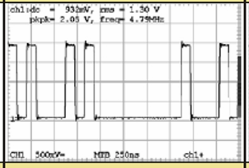
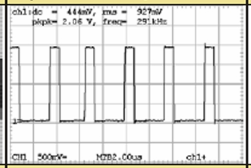
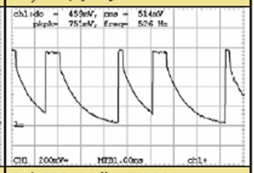
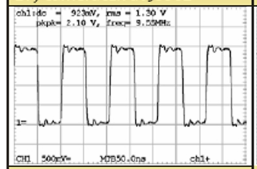
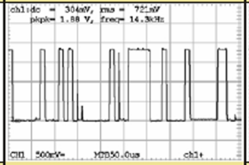
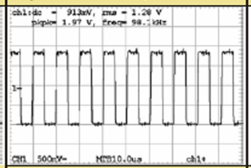
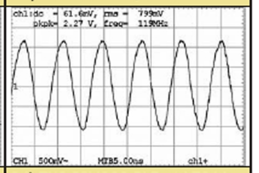
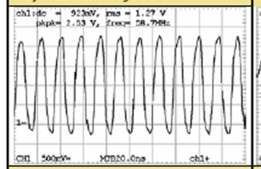
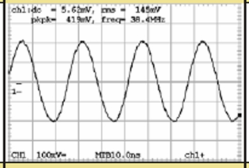
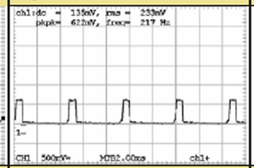
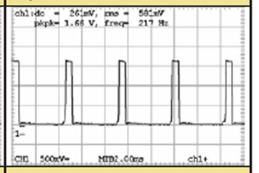
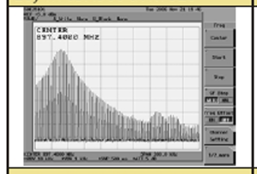
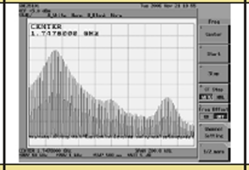
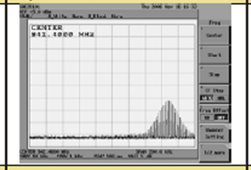
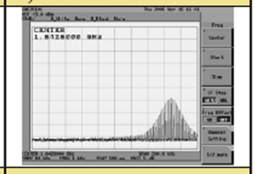
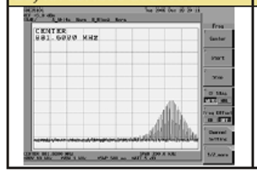
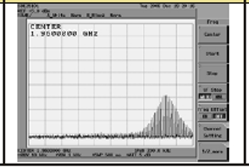
Camera

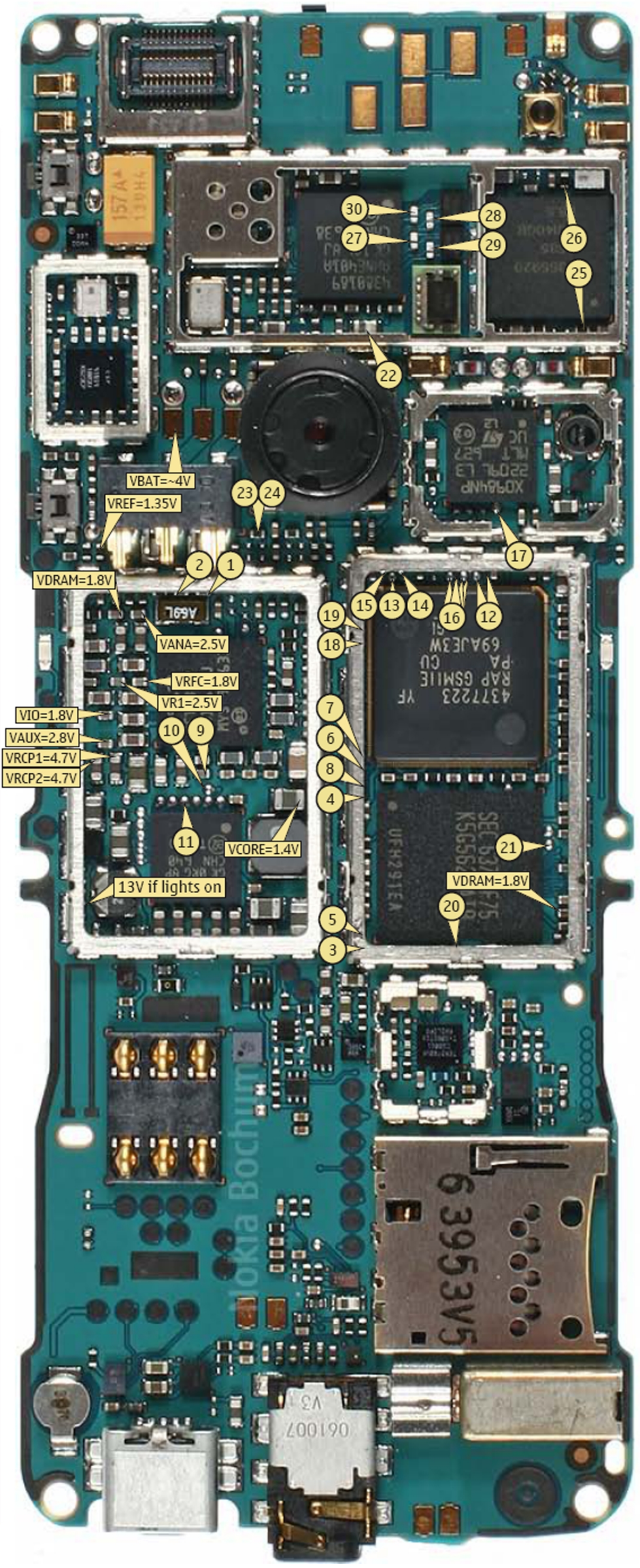

RAPGSM
CAM_CTRL_CMT(4:0)
I2C (1:0)
CCP_CMT(3:0)
J3301
J3302
J3300
17
HWA
D3300
SYSCLK
PDN
LDO_EN
LDO_STBY
SSDA
SSCL
PDATA1P
PDATA1N
PCLK1P
PCLK1N
HCLKP
HCLKN
HDATAP
HDATAN
RST
NC
TDO
TEST
ADC_IN
RST_DIR
AGND
MSCL
MSDA
GPIO0
GPIO1
GPIO2
GPIO3
GPIO4
GPIO5
GPIO6
GPIO7
PIEZO1
PIEZO2
PCLK2N
PCLK2P
PDATA2N
PDATA2P
1V2_OUT
VDD1V2
VANA
VDD1V8
VDD1V8/2V8
VDD_PIEZO
VDD_GPIO
TMS_OCI
TMS
TCK
TDI
DC1V8
DC1V8/2V8
DC_GPIO
K8,A8,C1,J3,F3,H9,J6,E3,K6= GND
C3305 4u7
C3303 100n
C3304 10n
C3313 10n
C3314 10n
VCAMDIG
1.8V
GND
~4V
VBAT
L3301 600R/100MHz
1.8V DC/DC converter
N3300
LM3671TLX-1.8V_NOPB
U//U
Vin
GND
FB
EN
SW
C3306 4u7
L3303 2u2H
C3307 10u
VDIG_CAM
R3301 4k7
R3300 4k7
Camera connector
X3300
VCAP
AGND
VANA
XSHUTDOWN
EXTCLK
CCISCL
CCISDA
CCPCLKN
CCPCLKP
VIO
CCPDATAN
CCPDATAP
C3302 220n
C3310 27p
C3300 100n
2.8V
VANA_CAM
VAUX
L3301 600R/100MHz
C3309 27p
C3301 100n
C3308 1u0

RF part


RF chip
N7505
AHNE401A
VBAT
~4V
L7502
600R/100MHz
C7508 18p
C7506 1u5
C7503 1u0
C7504 1u0
R7507 10R
C7501 2p7
R7506 10R
C7566 4p7
C7509 10n
C7505 1u0
VRCP1
4.7V
VRCP2
4.7V
VREF
1.35V
RETU
R7503 4k7
C7518 100n
R7502 10k
L7515 15nH
C7564 100n
C7515 4p7
R7501 2k2
T7501 EHF2BE3800
VCO
G7500 ENFVK3W2F07
C7516 470p
R7505 8k2
C7511 2n2
VR1
2.5V
C7561 820p
VCTCXO
R7508 10R
C7513 10n
G7501 NKG3176D
38.4MHz
VCONT
R7509 22k
C7507 10n
AFC
RETU TXC_CONV (2:0)
L7011 240R/100MHz
TXC
RXIP
RXIN
RXQP
RXQN
TXQN
TXQP
TXIP
TXIN
DAC_REF1
VREFCM
RAPGSM RFCONV (11:0)
RFBUSDAT
RFBUSCLK
RFBUSENA
TXRESETX
RAPGSM RFCTRL (8:0)
RFCLKP
RFCLKN
RFCLK(1:0)
RAPGSM
R7560 100R
C7565 47p
C7562 39p
C7563 47p
L7561 470nH
RFCLKEXT
Bluetooth
L7010 240R/100MHz
RFTEMP
RETU SLOWAD (6:0)
Z7501 SAWEP1G84CM0F04 1800/1900MHz
L7500 12nH
L7501 12nH
Z7504 SAWEP881MCM0F04 850/900MHz
L7504 22nH
L7505 22nH
C7522 1p8
Z7503 850/900MHz
LMSM43AA-341
R7510 15R
FEM
N7520 RF9282E6.3
J7500
C7525 18p
R7522 27k
R7523 0R
1800/1900MHz
C7521 1p5
T7520 LDB211G8010C-001
~4V
VBAT
Z7520 28R/100MHz
C7520 3p3
Antenna pads
E7501
E7502
E7503
R7000 0R
Z7001 0R
X7000
GND
PWRDET_G_ctrl
22
23
24
25
26
27
28
29
30

Signal overview

1) 32kHz at C2208 in 	2) 32 kHz at C2209 out 	3) SerClk at J2206 	4) SerData at J2207 
5) SerSelX at J2209 	6) SIMClk1 at J2213 	7) SIMDa1 at J2214 	8) SIMIOC1 at J2215 
9) VSIM1 at C2212 	10) SlClk at J2217 	11) SMPSClk at J2308 	12) RFCLK at J2851 & J2852 
13) RFBusClk at J2833 	14) RFBusDa at J2834 	15) RFBusEn1X at J2835 	16) RX I/Q at J2828-2831 
17) CameraCLK at J3302 	18) CameraSDA at J2803 	19) CameraSCL at J2804 	20) SDRAMClk at J3001 
21) FlashClk at J3004 	22) RFCLKEXT at L7561 	23) TXC GSM900 PL19 at L7011 	24) TXC GSM900 PL5 at L7011 
25) TX GSM900 at R7510 	26) TX GSM1800 at R7523 	27) RX GSM900 at L7504 	28) RX GSM1800 at L7501 
29) RX GSM850 at L7505 	30) RX GSM1900 at L7500 	31)	32)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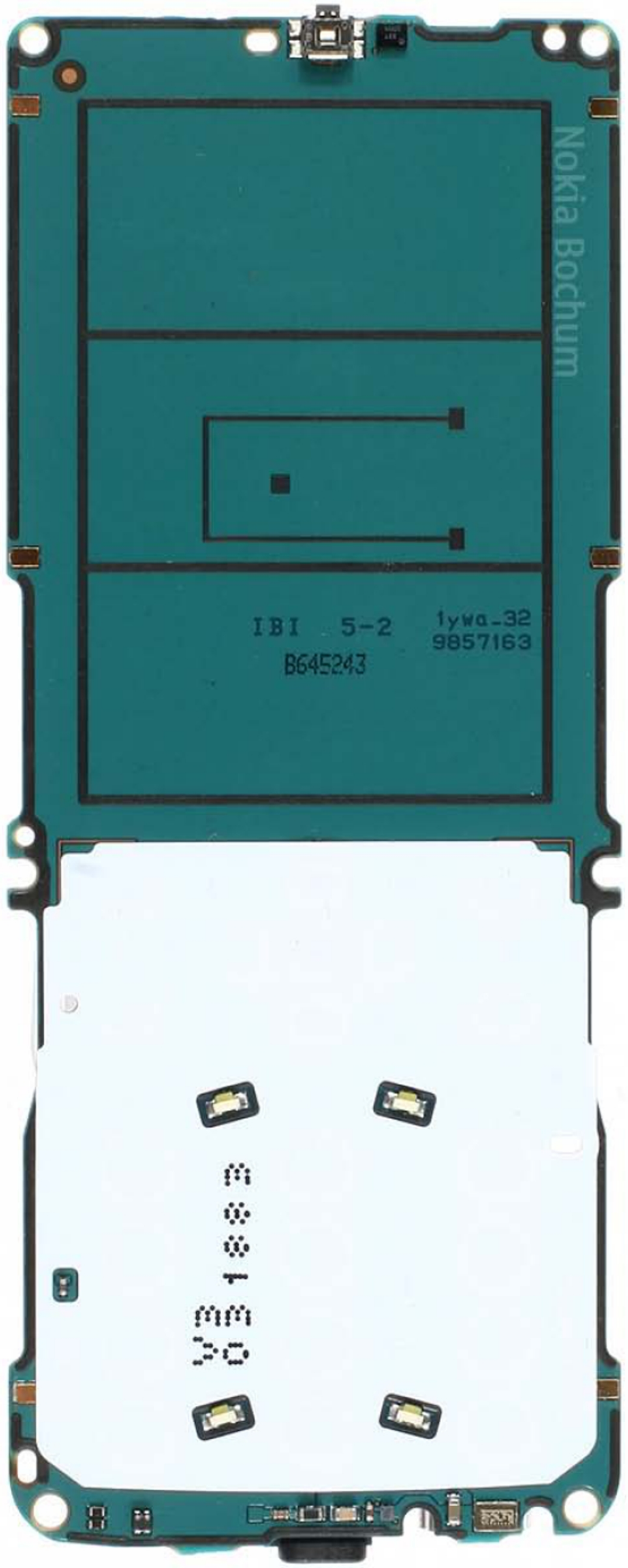
17
18
19
20
21
22
23
24
25
26
27
28
29
30
VBAT=~4V
VREF=1.35V
VDRAM=1.8V
VANA=2.5V
VRFC=1.8V
VR1=2.5V
VIO=1.8V
VAUX=2.8V
VRCP1=4.7V
VRCP2=4.7V
VCORE=1.4V
13V if lights on
VDRAM=1.8V
Nokia Bochum


Nokia Bochum
IBI 5-2
1ywa-32
9857163
B645243

Component finder

B		C2272	L5	C3300	P6	D3300	O7	J2310	J3	J7500	T8	R2035	D5	R6100	G7
B2100	B8	C2273	K4	C3301	N5	**E**		J2311	K3	**L**		R2036	D5	R6101	G7
B2101	T6	C2274	K4	C3302	N4	E2001	D4	J2312	K3	L2000	A5	R2044	H5	R6102	H7
B2200	M3	C2275	K4	C3303	O8	E2002	A6	J2313	K3	L2030	C5	R2045	E5	R6103	G6
C		C2281	L2	C3304	O8	E2003	D4	J2314	K3	L2031	C4	R2049	D4	R6104	G7
C2000	A4	C2300	J4	C3305	O6	E2010	A7	J2315	J3	L2032	D5	R2050	C4	R6105	G6
C2001	A3	C2301	I4	C3306	O8	E2070	P3	J2316	K2	L2033	D5	R2051	C5	R7001	T8
C2002	A5	C2302	K5	C3307	O8	E2071	P3	J2401	C2	L2034	D5	R2052	C4	R7002	T8
C2008	C2	C2303	I3	C3308	N5	E2075	P4	J2402	C8	L2035	C5	R2070	E2	R7501	R4
C2030	E5	C2304	K4	C3309	N5	E2101	Q6	J2403	D2	L2102	Q7	R2071	N2	R7502	S5
C2031	E5	C2305	I2	C3310	P6	E2102	Q9	J2404	D2	L2103	Q8	R2072	E4	R7503	Q5
C2032	D5	C2306	I4	C3313	O8	E2103	U6	J2405	C8	L2104	A7	R2074	E5	R7505	R4
C2033	E4	C2307	I4	C3314	P8	E2104	T6	J2406	C8	L2105	O2	R2100	H5	R7506	R5
C2034	E4	C2309	I5	C6020	T2	E2105	U7	J2407	D8	L2106	O2	R2101	H5	R7507	S5
C2035	C5	C2312	I3	C6031	R1	E2106	T6	J2408	B8	L2202	M2	R2102	T5	R7508	R4
C2040	H5	C2313	I3	C6032	P2	E2401	C9	J2409	C2	L2207	N4	R2103	T5	R7509	Q4
C2041	C3	C2314	J2	C6033	P2	E2402	C1	J2410	D2	L2208	N4	R2104	A8	R7510	Q8
C2042	D4	C2315	K2	C6034	P2	E2403	N1	J2411	D8	L2209	M5	R2105	A8	R7522	Q8
C2043	C4	C2317	J2	C6035	P1	E2405	T9	J2412	C2	L2210	M5	R2106	N5	R7523	S8
C2044	C4	C2403	N2	C6036	P2	E2407	N9	J2418	I5	L2211	M4	R2107	N5	R7560	Q6
C2045	D5	C2404	T2	C6037	P2	E2506	T1	J2419	H5	L2212	M4	R2200	M2	**S**	
C2046	C4	C2405	T4	C6038	Q1	E6001	T1	J2421	N2	L2270	L4	R2201	N2	S2401	O1
C2047	C4	C2413	I2	C6039	Q2	E6003	T1	J2428	J1	L2271	L4	R2202	M5	S2402	S1
C2048	C3	C2414	T2	C6040	P2	E7000	U8	J2429	N1	L2272	K4	R2203	M5	S2403	U5
C2049	H5	C2415	T4	C6051	Q2	E7001	U5	J2430	L1	L2273	K4	R2204	M5	**T**	
C2050	D5	C2416	T3	C6052	Q2	E7501	T9	J2431	N9	L2301	I4	R2205	M5	T6000	P1
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C2052	C5	C2418	T3	C6100	G7	E7503	U8	J2803	M6	L2304	J2	R2213	N3	T6002	P1
C2071	Q3	C2700	H2	C6101	H6	**F**		J2804	M6	L2305	I3	R2216	N3	T6003	P1
C2073	S2	C2701	H2	C6102	G7	F2000	A5	J2828	N7	L2306	I3	R2250	N2	T6004	Q1
C2074	L2	C2800	L8	C6103	G7	**G**		J2829	N7	L2402	T3	R2251	N2	T6005	Q2
C2076	Q4	C2801	N8	C6104	H6	G2200	C2	J2830	N7	L2403	J2	R2303	H3	T7501	R3
C2077	M2	C2802	M8	C6105	G6	G7500	S4	J2831	N7	L2404	T3	R2400	G4	T7520	S9
C2078	M2	C2803	L8	C6106	H6	G7501	Q3	J2833	N6	L2405	O2	R2406	N2	**V**	
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C2100	G5	C2807	N8	C6109	G6	J1001	E4	J2851	N7	L3303	P8	R2418	H4	V2402	G5
C2101	F5	C2808	M8	C7000	U8	J2000	A6	J2852	N7	L3304	O9	R2419	H5	V2405	G4
C2102	H5	C2809	M8	C7001	T8	J2001	D4	J3000	I7	L6030	Q2	R2421	K2	V2406	G6
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C2104	O2	C2811	K6	C7011	N4	J2006	E5	J3002	L6	L6032	Q1	R2423	G5	V2409	C4
C2200	M5	C2812	L8	C7012	N5	J2007	D2	J3003	I7	L6077	R2	R2424	I4	V2410	H4
C2201	M2	C2813	N6	C7013	N4	J2008	D3	J3004	J8	L6100	G7	R2425	G4	V2411	H4
C2202	N2	C2814	M8	C7501	S5	J2009	D3	J3005	J8	L6101	H6	R2426	N9	V2412	M1
C2203	M4	C2815	K8	C7502	Q5	J2010	A7	J3006	K7	L7010	N5	R2427	L1	V2413	M9
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C2205	M4	C2818	K6	C7504	S5	J2071	P3	J3101	H9	L7500	S6	R2803	L8	X1001	U3
C2206	M4	C2819	K8	C7505	Q4	J2072	P4	J3102	G9	L7501	S6	R2804	L8	X2000	A7
C2207	N2	C2820	N6	C7506	Q4	J2074	P3	J3103	G9	L7502	Q5	R3000	J6	X2002	B3
C2208	N3	C2821	N6	C7507	Q4	J2075	P4	J3104	G9	L7503	Q8	R3002	L8	X2030	B5
C2209	N3	C2831	N7	C7508	Q5	J2101	Q7	J3105	G9	L7504	R6	R3003	K6	X2060	A3
C2210	K3	C3000	I6	C7509	R4	J2102	Q8	J3106	G9	L7505	R6	R3004	K7	X2070	O3
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C2213	L3	C3003	K8	C7515	S4	J2206	I6	J3113	E3	**M**		R3202	H8	X3300	P5
C2214	L2	C3004	K8	C7516	S4	J2207	K6	J3114	E3	M2100	C8	R3203	H7	X7000	T8
C2215	L2	C3005	J8	C7518	Q5	J2209	I6	J3115	E2	**N**		R3204	H7	**Z**	
C2216	L2	C3006	I8	C7520	S8	J2210	M4	J3116	E3	N2030	D5	R3205	G8	Z2001	C2
C2217	M3	C3007	J8	C7521	S8	J2212	L6	J3117	E3	N2031	C3	R3206	G8	Z2400	H4
C2219	M2	C3008	J8	C7522	Q8	J2213	K6	J3200	G8	N2300	J3	R3300	P7	Z2401	U4
C2220	K3	C3009	I8	C7523	S8	J2214	K6	J3201	G8	N2301	J2	R3301	P8	Z2402	R2
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C2222	K2	C3013	K7	C7525	Q9	J2216	K4	J3203	G8	N3200	G8	R3306	P7	Z6030	R2
C2223	L4	C3014	K7	C7560	R3	J2217	K4	J3300	P8	N3300	O8	R3307	P7	Z7001	T8
C2224	M4	C3100	E2	C7561	R4	J2218	K4	J3301	O6	N3301	O6	R3312	I8	Z7002	T8
C2225	M2	C3115	O7	C7562	Q6	J2219	J6	J3302	O7	N6030	P2	R3313	I8	Z7501	S7
C2226	L2	C3116	O7	C7563	Q5	J2220	L6	J6001	S2	N6100	H7	R3314	O6	Z7503	Q6
C2227	K3	C3200	G8	C7564	S4	J2221	L6	J6003	S2	N7505	R5	R6005	N2	Z7504	R7
C2228	L2	C3201	H8	C7565	Q5	J2222	D2	J6100	H7	N7520	R8	R6020	T2	Z7520	S7
C2230	M3	C3202	H7	C7566	R4	J2300	K3	J6101	H7	**R**		R6030	P2		
C2231	K5	C3203	G8	**D**		J2306	Q3	J6103	H7	R2007	C2	R6031	Q1		
C2232	L2	C3204	H7	D2200	L3	J2307	Q3	J6104	H7	R2008	C2	R6032	P2		
C2270	L5	C3210	G8	D2800	L7	J2308	K3	J6105	H7	R2033	E5	R6034	Q2		
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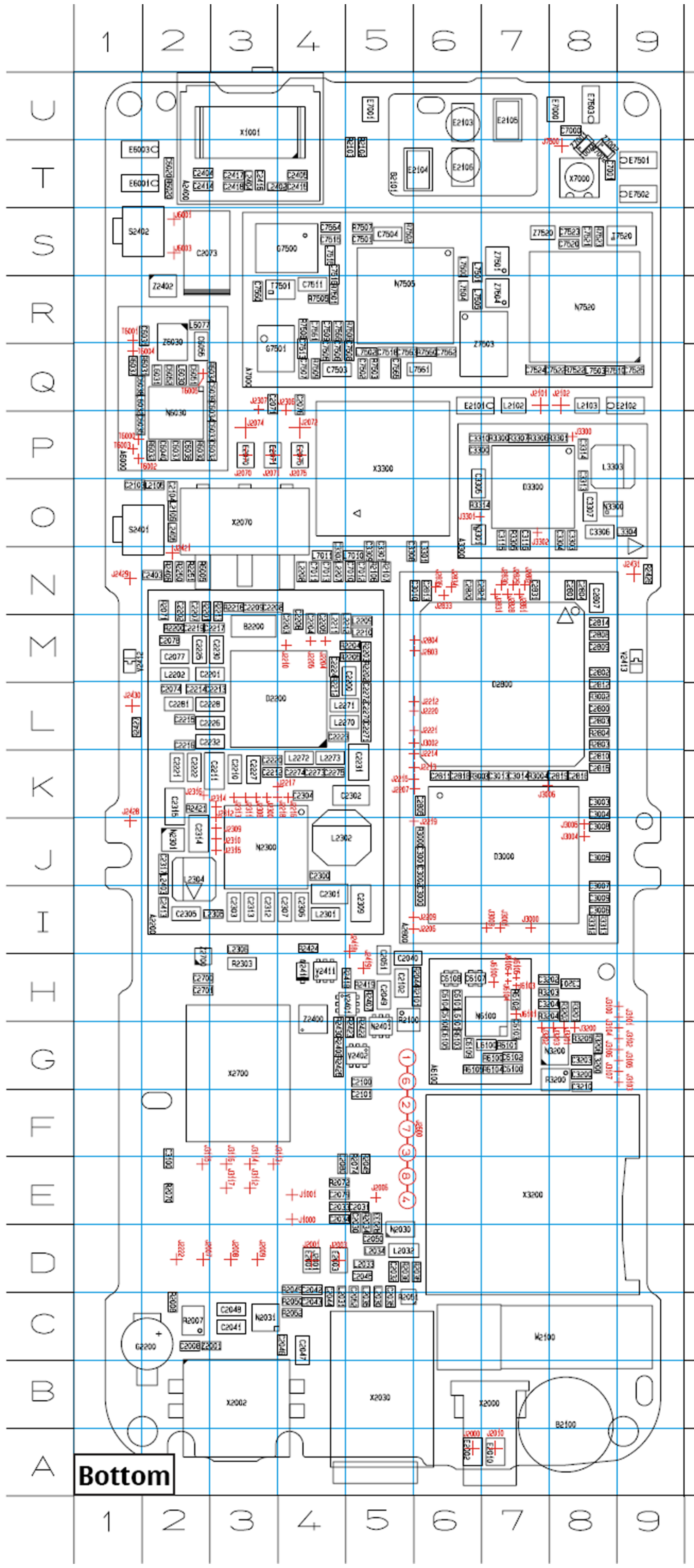

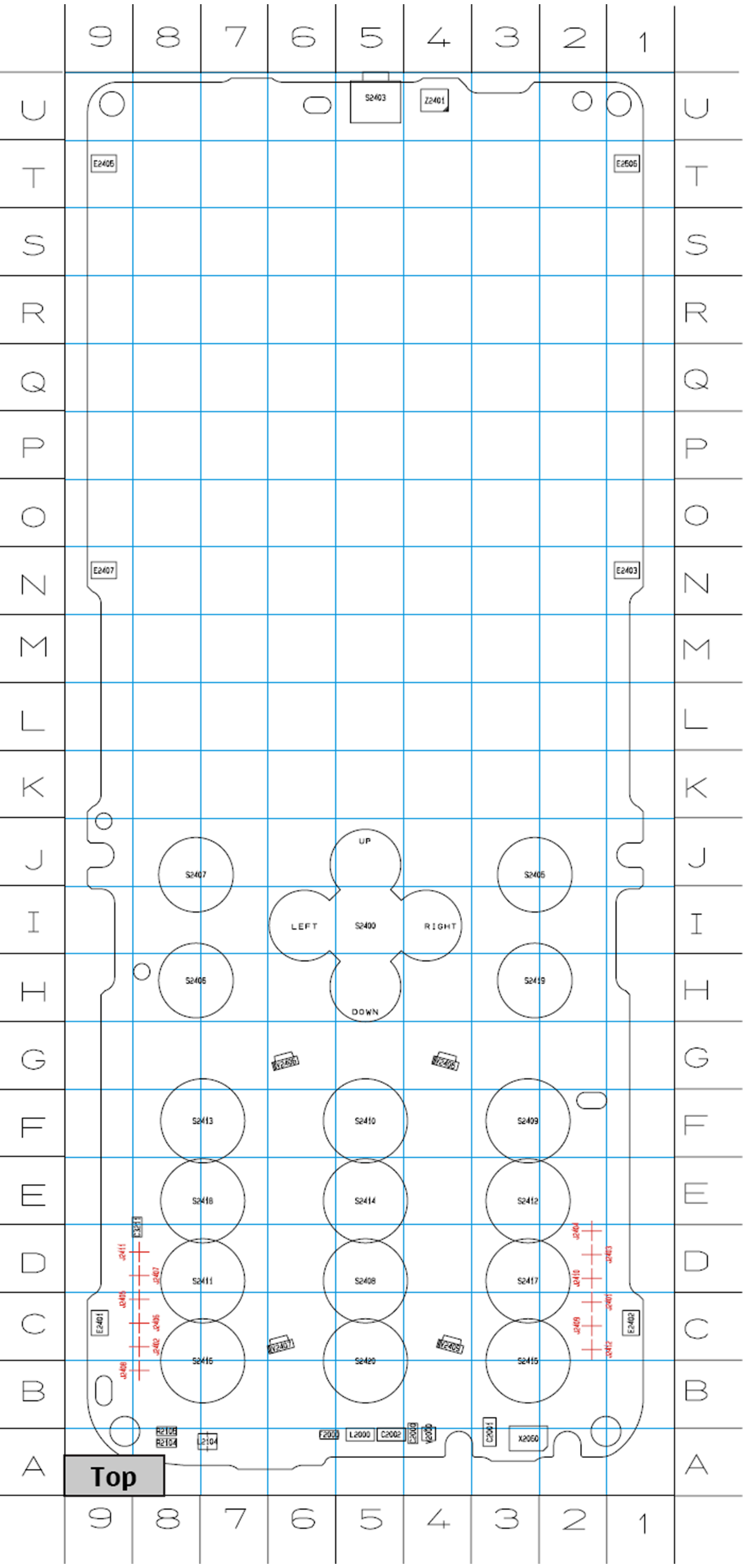

Glossary

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A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analouge converter
DAC	Digital-to-analouge converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIB	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHAR	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Associasion
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architechture
OMAP	Operations, maintenance, and administartion part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noice ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP, Official Tiku3G
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
Vp-p	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)